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CHAPTER I

INTRODUCTION

In the last two and one-half decades there has been a resurgenc of interest in the economics of growth and development particularly in regard to less developed countries. However, this interest does not appear restricted but seems universal to most countries of the world re gardless of their size, age, polity or degree of development. The more developed countries as well as the underdeveloped nations are concerned with the stagnation or possible stagnation of their economies. Stagnation, while still a controversial subject in the United States,[1] is a reality to many nations and a matter demanding urgent attention.

This renewed interest may be viewed as a natural consequence of the dramatic events that have occurred during this period. Following the Second World War the reconstruction problems of wartorn economies had to be faced as did the problems resulting from the ideological split between the Communist Bloc and the West. The collapse of the colonial empires and the desire for economic betterment by the emerging nations has also helped to focus attention on the problems of economic

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[1]A. H. Hansen, "Growth and Stagnation in the American Economy," Review of Economics and Statistics (November, 1954), pp. 409-414; A. H. Hansen, Full Recovery or Stagnation? (New York: W. W. Norton and Company, Inc., 1938), Chapters XIX, XX; G. Terborgh, The Bogey of Economic Maturity (Chicago: Machinery and Allied Products Institute, 1945) A. F. Burns, "New Stagnation Theory and Our Current Problems," The Commercial and Financial Chronicle (April 27, 1961), p. 15.

development. . . .

The realignment of power in the world plus Communist dedication to the conversion of all nations to its ideology has brought sharp realization to the West that the world has indeed changed. Hence, we have witnessed the creation of a number of collective-security alliances that are designed to encircle, where possible, the Communist Bloc and to contain expansionary threats from it. The Communists in turn have signed a mutual defense agreement known as the Warsaw Pact. The desire for economic and political stability has contributed to the formation of such international bodies as the United Nations, the International Monetary Fund (IMF), the International Bank for Reconstruction and Development (IBRD), and its agencies the International Finance Corporation (IFC) and the International Development Association (IDA).

Various economic associations have come into being during this period reflecting regional economic cooperation on a variety of economic problems. The Communist Organization for Economic Cooperation governs trade between the Communist countries. In Western Europe the European Free Trade Association, the European Economic Community, the European Coal and Steel Community and Euratom have been formed. The United States has joined the countries of these Western European associations and other nations in establishing the Organization of Economic Cooperation and Development and the General Agreements of Tariffs and Trade.

This new world with its new power blocs and economic alignments has at times been characterized as being composed of rich nations and poor nations[1] with the gap of development between them expanding. Some

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[1]Barbara Ward, The Rich Nations and the Poor Nations (New York: W. W. Norton and Company, Inc., 1962), p. 34; and Robert Theobald, The Rich and the Poor (New York: The New American Library of World Literature, Inc., 1961).

writers prefer not to see the world generalized as divided between underdeveloped and developed but rather as being spaced as beads along a line depicting various degrees of development.[1] In any case there is a consensus that an ever growing gap does exist for it is much easier for a developed country to continue expanding than it is for a poorer country to progress. This unfortunate situation is now recognized to be one of the major economic problems facing the world today.

The nationalism which accompanied the disintegration of most of the colonial empires brought with it not only the demand for political independence but also for better economic well-being and has resulted in the establishment of planning agencies in a number of the underdeveloped lands. This economic state of mind which has been variously described as the Great Awakening[2] or the Great Ascent[3] has produced a popular consciousness concerning the problems of underdeveloped countries and the process of economic development.

Ward[4] explains the gap in terms of four revolutions that have originated in the North Atlantic area of developed countries but have only partially been at work in the underdevelopment areas of the world. The idea of men treating one another as equals, the desire for material things or this-worldliness, the biological revolution of rising birth rates spurring economic growth and the application of science and capital

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[1]John K. Galbraith, Economic Development in Perspective (Cambridge: Harvard University Press, 1962), p. 19.

[2]Gunnar Myrdal, Rich Lands and Poor (New York: Harper Brothers Publishers, 1957), p. 7.

[3]Robert L. Heilbroner, The Great Ascent (New York: Harper and Row Publishers, 1963), p. 17.

[4]Ward, The Rich Nations and the Poor Nations, p. 16.

to all economic processes are matters of unfinished business in the less-developed lands and represent a challenge to the West to help these nations to bridge the historical gap.

The West's awareness of this situation has manifested itself in various ways. Myrdal[1] observes that the static term "backward countries" has in this recent period been replaced by the dynamic term "underdeveloped countries" carrying with it a positive attitude by the richer nations toward their less fortunate neighbors' aspirations and demands for higher standards of living and greater equality of opportunity.

Other indications of response may be found in the invitations tendered to former British Colonies to join the British Commonwealth of Nations and to former Belgian and French Colonies to join in associate membership the European Economic Community. The Colombo Plan for South and South-East Asia as well as the newly formed Alliance for Progress plan for Latin America are further indications of positive interest.

On the international level the financial assistance rendered by the West to such United Nations agencies as the World Health Organization, the Technical Assistance Board, the United Nations Special Fund, the Food and Agricultural Organization and the previously mentioned financial institutions represent other attempts, though generally considered to be inadequate, to assist the economic development of these poor nations.

Thus the West's interest, particularly that of the United States,

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[1]Myrdal, p. 8.

can be summed up as being threefold: humanitarian in that we have traditionally championed the underdog and have demonstrated our feeling of duty toward our fellow human beings abroad through the establishment of schools and hospitals and have provided emergency relief in times of disaster;[1] political in that we would prefer to contain the spread of communism and wish to live in a society more closely aligned with our form of political institutions and ideas of liberty and freedom; economic in the sense that we continue to depend on raw materials from these countries and wish to broaden our trade with them as their economies develop and new markets for our exports are opened up.[2]

This study is concerned with two such underdeveloped countries, India and Pakistan. The purpose of the inquiry is to examine and compare the economic development of these two nations from the period since independence up to the present (1947-1960) and to focus wherever possible on the role that natural resources have played in this development, whether positive or negative. There is no intention in this study to downgrade or upgrade any given factor's contribution to economic development or to present a new single-factor theory of growth. The intention is, however, to focus attention on a factor that usually has received less emphasis in such studies.

Discussions of economic growth and development are not new to the field of economics, and a brief examination of them and their particular

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[1] Eugene Staley, The Future of Underdeveloped Countries (New York: Frederick A. Praeger, Publisher, 1961), p. 53.

[2] Jacob Viner, "America's Aims and the Progress of Underdeveloped Countries," in B. F. Hoselitz (ed.), The Progress of Underdeveloped Areas (Chicago: University of Chicago Press, 1952), p. 175.

points of emphasis is desirable. These writings can be dated back to Adam Smith and his emphasis on capital accumulation as a basic growth determinant.[1] Ricardo, Marx and later Schumpeter are among others who contributed their analyses to this field. Ricardo focused his attention on the action of diminishing returns to agriculture as population increases forcedthe use of poorer and poorer land and saw stagnation occurring when declining profit rates ultimately lead to a cessation of capital accumulation.

Marx and Schumpeter both were concerned with the long run view and took into account not only the economic but also the political, social and historical factors in society. Marx forecast the fall of capitalism as resulting from a maladjustment between falling purchasing power of the working masses and the increasing output brought on by technological progress and increased investment. Schumpeter assigned innovation and entrepreneurial activity a central role in economic growth and saw an unfriendly social environment as the chief agent eroding the capitalist framework.

While most of the theories of economic development, from Smith to Hansen, agree that increased development is related to the four main factors of capital accumulation, new resource discovery, population growth and technological advancement,[2] a thoroughly comprehensive theory has not been formulated. Domar describes the present state of the field

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[1]Adam Smith, The Wealth of Nations (New York: Random House, Inc., 1937), p. 326.

[2]Benjamin Higgins, Economic Development (New York: W. W. Norton & Company, Inc., 1959), p. 239; and Gerald M. Meier and Robert E. Baldwin, Economic Development (New York: John Wiley & Sons, Inc., 1957), p. 120.

when he notes that:

> The treatment of the subject falls into two rather sharply differentiated parts: general treatises and highly simplified symbolic models, with a wide gap in between. Neither approach taken by itself is satisfying. The former is usually deficient in analysis and the latter is too narrow and deceivingly exact. Both should be looked upon as the opposite ends of a bridge, the construction of which will perhaps some day give us a workable theory of growth.[1]

Williamson sums up the specifications needed for such a theory when he states,

> A satisfactory theory of the economics of growth would identify the principal factors in the process and indicate the extent to which they are relatively dependent or independent variables; it would furnish analytical tools necessary to show causal relations; it would be susceptible to empirical verification; and its relevance would not be restricted temporally, spatially, or to any particular cultural or institutional pattern."[2]

It remains to be seen whether so complex a process as development will ever have a satisfactory theory assigned to it.

Work on Domar's bridge continues as evidenced by the many recent contributions made to the field of economic growth and development, especially in terms of the underdeveloped nations. Black in his short book, The Diplomacy of Economic Development, observes that few subjects have recently been as intensively studied by all of the social sciences as has economic development which has resulted in a complex body of literature.[3]

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[1]Evsey D. Domar, Essays in the Theory of Economic Growth (New York: Oxford University Press, 1957), pp. 18-19.

[2]Harold F. Williamson, Comment on Moses Abramovitz's article on "Economics of Growth," in Bernard F. Haley (ed.), A Survey of Contemporary Economics, Vol. II (Homewood: Richard D. Irwin, Inc., 1952), p. 181.

[3]Eugene Black stresses this complexity in his opening statements in The Diplomacy of Economic Development (Cambridge: Harvard

Due to the broad extent of this body of literature only a few of the recent works will be mentioned briefly here. The question of balanced[1] versus unbalanced [2] growth has been given considerable attention. Psychological and sociological factors in economic growth have been treated by McClelland and Hagen.[3] Domar in his economic growth model had stressed the dual role of investment.[4] Lee has analyzed the effects of climate in the tropics on crop and animal production, human health and efficiency and industrial development.[5]

In working toward the construction of an economic growth theory, Kuznets, who favors an empirically-determined theory, feels that an integration of subtheories dealing with population growth, growth of

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University Press, 1960), p. 1 when he states, "To digest and order this body of literature would require a philosopher, well schooled in academic economics, with a good command of history who held a degree in civil engineering, with geography and anthropology as minor subjects, and who had taken a postgraduate course in social psychology."

[1]P. N. Rosenstein-Rodan, "Problems of Industrialization of Eastern and Southeastern Europe," Economic Journal, (June-September, 1943), pp. 202-211; and reprinted in Bernard Okun (New York: Holt, Rinehart and Winston, 1961), pp. 124-132; and Ragnar Nurkse, Problems of Capital Formation in Underdeveloped Countries (Oxford: Basil Blackwell, 1953), pp. 11-23.

[2]Albert O. Hirchman, The Strategy of Economic Development (New Haven: Yale University Press, 1961), pp. 50-73.

[3]David C. McClelland, The Achieving Society (Princeton: D. Van Nostrand Company, Inc., 1961), and Everett E. Hagen, "On the Theory of Social Change: How Economic Growth Begins," Conference for International Studies (Boston,Mass.: Massachusetts Institute of Technology, 1962).

[4]Domar, pp. 83-108.

[5]Douglas H. K. Lee, Climate and Economic Development in the Tropics (New York: Harper & Brothers, 1957).

the stock of knowledge, long-term processes of internal adaption to growth potentials and external relations of national units in both conflict and cooperation are necessary.[1] Rostow's contributions include: the formulation of a number of propensities which depict the response of a society to its overall environment, and the development of characteristics helpful in identifying nations in terms of their stages of growth.[2]

Adelman has worked out a number of symbolic models using the economy's output level as an index of the stage of development which included in the production function the interdependent variables of the amount of capital stock employed, the rate of use of natural resources, the employment of the labor force, society's fund of applied knowledge and the socio-cultural milieu within which the economy functions.[3]

Nurkse and Lewis, in addressing themselves to the problem of capital formation, discussed the large-scale disguised unemployment in the agricultural sectors of many of the overpopulated underdeveloped countries.[4] Nurkse suggests that the surplus workers be transferred

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[1] Simon Kuznets, "Toward a Theory of Economic Growth," in Robert Lekachman (ed.), National Policy for Economic Welfare at Home and Abroad (Garden City, N.J.: Doubleday and Company, Inc., 1955), pp. 12-93.

[2] W. W. Rostow, The Process of Economic Growth (New York: W. W. Norton & Company, Inc., 1962), and W. W. Rostow, The Stages of Economic Growth (Cambridge: Cambridge University Press, 1960).

[3] Irma Adelman, Theories of Economic Growth and Development (Stanford: Stanford University Press, 1961).

[4] Nurkse, pp. 32-56; and W. A. Lewis, Economic Development with Unlimited Supplies of Labor (Manchester: The Manchester School, 1954), and Reprinted in A. N. Agarwala and S. P. Singh (eds.), Economics of Underdevelopment (Bombay: Oxford University Press, 1958), pp. 400-450.

from the agricultural sectors and be put to work on such capital projects as public utilities, transportation facilities and irrigation work. This transfer would promote development as now more people are employed productively with very little investment being required. Success of the scheme rests largely on the ability to transfer the now surplus food from the agricultural sectors to the non-agricultural sectors of the economy.

In attempting to define an underdeveloped country one encounters considerable difficulty because of the lack of common denominators among these nations. Also, no country can be said to be completely developed since no country has fully utilized its entire potential. These lesser developed nations can be either young or old in age, have varying degrees of natural resource endowment, have varying degrees of population pressure on their land due to the size of population and the character of the land within their borders, and have different levels of modern technological competence. In addition, these nations can be in different stages of development with different rates of economic growth. They are indeed stretched along a continuum between developed and underdeveloped as suggested by Galbraith's "beads along a line."

These countries have been defined by a variety of indices ranging from per capita consumption to the extent of newspaper circulation. Leibenstein, in his study of underdevelopment, compiled a list of most commonly mentioned characteristics that numbered forty items.[1]

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[1]Harvey Leibenstein, Economic Backwardness and Economic Growth (New York: John Wiley & Sons, Inc., 1957), pp. 40-41.

From all of these writings one prevalent characteristic emerges, that is, all of these nations are poor. They are poor in the economic sense when compared to such highly developed countries as the United States, Australia, Canada and the nations of Western Europe. Even though the per capita income criterion is recognized as inadequate, this measure is still accepted as the most useful one available in describing the different levels of economic development among nations. Whether one prefers Mason's definition of underdeveloped countries as having per capita incomes below one hundred dollars[1] or Higgins' per capita incomes of less than one-quarter of that of the United States (about $500),[2] India and Pakistan with per capita incomes of less than ninety dollars certain fit the definition of underdevelopment.

A review of the recent literature on economic growth and development, especially the texts and general works, reveals a tendency on the part of the authors to assign a rather subordinate role to natural resources as a factor in economic development. Adler makes the point that, "their authors do not consider a particular level or composition of resource endowment an essential prerequisite of economic development."[4] He illustrates the point by citing a few examples, one of which

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[1]Edward S. Mason, Economic Planning in Underdeveloped Areas (New York: Fordham University Press, 1958), p. 6.

[2]Higgins, p. 6.

[3]Natural resources may be defined as the various phenomena that nature makes available to man such as land, minerals, energy sources and forests, the utilization of which depends on the state of technological knowledge and other factors.

[4]John H. Adler, "Change in the Role of Resources at Different Stages of Economic Development," in Joseph J. Spengler (ed.), Natural Resources and Economic Growth (Washington: Resources for the Future, Inc., 1961), p. 52.

is the Approaches to Economic Development by Buchanan and Ellis in which the authors limit their most explicit reference to natural resources to a short footnote. Adler later concludes that:

> It is this passive function of resources as the object of improvement rather than as a vehicle of development which explains the apparent conflict between the subordinate role which the literature attributes to resources in general and the importance which in specific instances and concrete situations is given to the resource endowment of a country. There is hardly a survey report on an underdeveloped country, or any other document prepared as a basis for policy advice and guidance, which does not emphasize the importance of existing resources . . . and makes recommendations for their improved utilization.[1]

This tendency is not solely attributable to economists and can be observed in the works of other social scientists such as Rostow and McClelland who have been previously cited. The works of geographers are a somewhat special case and will be noted later.

The rationale for giving resource endowment a modest role in economic development seems to revolve around a few major factors perhaps best described as technology, substitutability, the use of trade and the historical fact that growth was accomplished in such countries as Japan and Switzerland and others despite meager resource endowment. In addition, there are countries which are relatively rich in natural resources but have to date remained underdeveloped. Another factor might also be added, that is the simple recognition that under our present stage of knowledge we do not have a clear understanding as to the relative role natural resources play and have to date been unable to devise a suitable index for comparison purposes largely because of the complex nature of natural resources.

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[1] Ibid., p. 54.

This writer does not wish to leave the implication that the subject of natural resources has been completely shunted aside and left in a state of vagueness. There are some exceptions. Kindleberger[1] in his short chapter on land stresses that the land factor's relationship to economic development is a many-sided affair especially since land itself has many varied physical and economic aspects. Land can be discussed in terms of both agricultural and industrial inputs as well as a barrier to transport. Land also bears a relationship to labor, capital, technology and the social structure. Kindleberger may well have laid his finger on one of the reasons for the state of our present knowledge concerning natural resources when he wrote:

> We conclude that it is difficult to define land unambiguously and as distinct from capital . . . and technology; that has abundant capital . . . and human drive and creativeness to substitute for the niggardliness of nature. . . . To ask the question, whether small differences in land, or small differences in social structure, are more significant in boosting or halting economic development, is to outrun the capacity of the discipline for answering questions. Many of us have opinions; not one knows.[2]

The opinion that an unambiguous definition of land is difficult to derive and is relatively unimportant to developed countries provides, of course, little solace and guidance to some of the underdeveloped countries who have not only a scarcity of natural resources but also a dearth of capital, entrepreneurial talent and technical knowledge. Danish economist Thorkil Kristensen is perhaps more explicit when he observes that the concepts of labor and capital have had a long history

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[1]Charles P. Kindleberger, Economic Development (New York: The McGraw-Hill Book Company, Inc., 1958), p. 18.

[2]Ibid., p. 34.

and have undergone a process of definition and adaptation to the demands of economic science--a science whose present form reflects the conditions and problems found in the countries where it was developed, that is, the highly developed countries which, because of abundant capital and a high level of technology, are not so directly dependent on natural conditions as are the underdeveloped countries.[1]

In regard to the writings of geographers, natural resources have long been a subject of their interest and form an integral part of any definitive geographical study whether it be of a region or of a specific country. These studies, however, have not necessarily stressed the relation of resources to economic development. In the words of Ginsburg, "there has been a conspicuous poverty within the geographical literature along these lines."[2] Ginsburg, in the opinion of this writer, appears well qualified in his judgment as his pioneer article "Natural Resources and Economic Development"[3] is probably one of the clearest and most incisive reviews of the problem of defining the role of natural resources in economic development that has been recently made by a geographer.

There have been also a number of writings by geographers and

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[1]Thorkil Kristensen in his and his associates' work, The Economic World Balance (Copenhagen: Munksgaard, 1960), p. 45, lists the factors of growth as labor, capital, culture and nature, the last of which is defined much in a way a geographer would define it, that is, as the entire complex of natural (i.e., not man-made) things and conditions which have influence, in a positive or negative way, on production and life in the area.

[2]Norton Ginsburg (ed.), Essays on Geography and Economic Development (Chicago: The University of Chicago, 1960), p. x.

[3]Norton Ginsburg, "Natural Resources and Economic Development," Annals-Association of American Geographers (September, 1957), pp. 197-212.

others on natural resources from the conservation point of view. These works have generally been concerned with population growth and its attendant pressure on the resources of a given country or the world in general. Natural resources have been cast in the role of a limiting factor, but technology has been recognized in many of the works as helping to subordinate the problem.

We seem to have here that which Kristensen describes as two groups of writings which largely deal with the same problem but tend to differ in their basic assumptions with the economists making little use of the results gained by the other scientists and the latter, on the other hand, availing themselves equally little of the writings of economists.[1] The result is that the need for a workable analysis of the interaction of natural conditions and economic development continues to exist.

Awareness of the situation, however, appears to be high and work on the problem is proceeding as evidenced by a number of meetings recently held, some of them interdisciplinary in nature. Two of these conferences might be mentioned here as illustrations. The previously cited work, Essays on Geography and Economic Development, is the result of a meeting of geographers held at Santa Monica in the fall of [illegible]. Another important conference was held at Ann Arbor in April, 1960, where social scientists from the various disciplines gathered to assess the role played by land and other natural resources in economic development. The results of this meeting were published in Natural Resources and Economic Growth, also previously cited.

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[1] Kristensen, p. [illegible].

development. This statement recognizes the need for including the factor in the combination of factors that affect development.

2. Natural resources contain little, if any, element of causality and cannot be described as determining economic development. This statement merely reiterates the commonly-shared belief that a group of factors rather than any single factor can be said to determine economic development.

3. Natural resources cannot be divorced from technology. This recognizes the passive or latent utility qualities of resources and permits them to be considered from an economic point of view.

4. A limited supply of natural resources need not be an insurmountable obstacle to economic development if other factors are available for substitution and conversely, a greater abundance of natural resources may help to relieve the pressure on other factors needed to assure development.

5. Accessibility can be of appreciable value in stimulating economic growth since it helps to facilitate the use of natural resources which might otherwise remain unutilized. Inaccessibility can, of course, be overcome by additions of other factor inputs should demand conditions warrant this action.

6. It has been said that underdeveloped countries do enjoy some advantages, one of which is the access to modern productive techniques. This is of considerable importance to countries in the pre-take-off stage since these new techniques can, barring institutional obstacles, be directly applied sometimes without great amounts of capital but yet result in substantial increases in production. An

One inference which might be drawn from the above list is that the concept of natural resources tends to be elusive and seems best discussed in relation to the other factors of economic development. The applicability of the above propositions along with others that present themselves in the course of this study will be evaluated in terms of India and Pakistan.

The study will first include a brief presentation of the physical setting of these two nations with some attention being given to the critical role played by weather. The following chapter will present the respective countries' completed economic plans, their targets, results and economic policies. The major sectors of agriculture, power development and fuels, minerals, agricultural raw materials and industry will be examined with emphasis being placed on the role of natural resources to these sectors.

The study will be limited to the extent that it is not based on first-hand observation. Publications or data issued by the governments of India and Pakistan were used wherever possible as were the information sources of the United Nations. All available works, both in journal and book form, by Indian and Pakistani writers were reviewed as was the literature of other recognized authorities.

The study of underdeveloped countries such as India and Pakistan is important for a number of reasons. The underdeveloped part of the world is dominant in both numbers of people and extent of land. India alone contains forty per cent of the population of all underdeveloped areas.[1] Their problems, especially those of the heavily populated

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[1]Jay H. Cerf and Walter Pozen (eds.), Strategy for the 60's (New York: Frederick A. Praeger, Publisher, 1961), p. 145.

countries, tend to be more acute than those of developed countries for their economies are usually less flexible and suffer hardship in adjusting to crises that arise.

India and Pakistan share a similar history in that they received their independence simultaneously on August 14, 1947, after many decades of British domination. They have both suffered from partitioning of the sub-continent but have also demonstrated their desire to develop their economies through planning. Most foreign policy studies made by research associations in the United States agree that a critical failure in the next ten years to the development plans of these two countries could damage, perhaps permanently, the prestige of democracy in these countries or all of Asia and the rest of the underdeveloped world, many of which are following the progress of the subcontinent closely.[1]

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[1] *Ibid.*, p. 10.

upon which many of man's industries have been built and upon which his livelihood is gained. Thus, this chapter will investigate some of the main features of this environment and attempt to ascertain what recognizable influences are at work and their economic importance.

Location and Area

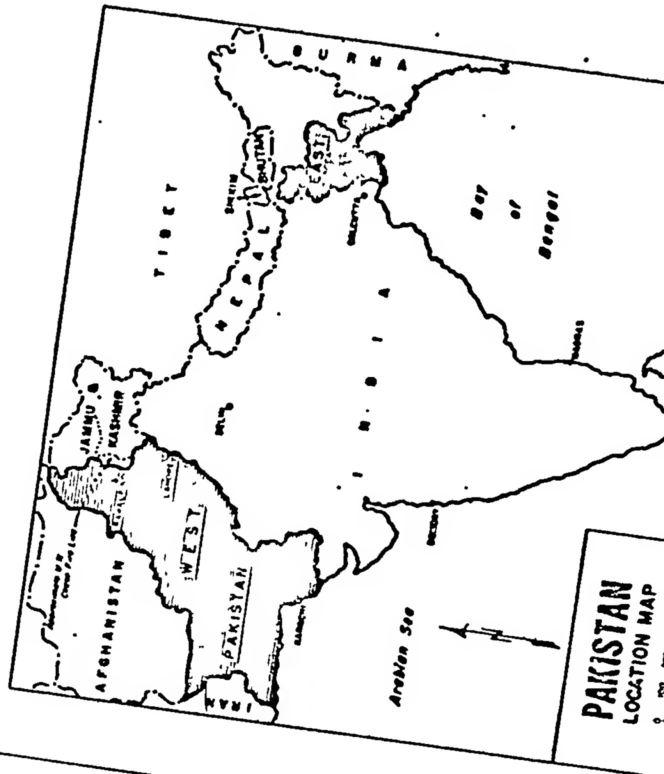
The Indo-Pakistan subcontinent is the middle of three southern peninsulas that jut out from the mainland of Asia. It lies above the equator between the latitudes 8° and 37° north and between the longitudes 62° and 97° east with the Tropic of Cancer bisecting it.

Of the total area of over 1,720,000 square miles, Pakistan accounts for about 365,000 square miles, the disputed territory of Jammu and Kashmir accounts for 92,000 square miles and India accounts for the remaining 1,263,000 square miles. Surrounding India and Pakistan (see figures 1 and 2) are Afganistan, Iran and the Arabian Sea to the east, the Indian Ocean and Ceylon to the south and Burma and the Bay of Bengal to the west. To the north are China, Nepal, Sikkim and Bhutan, the latter two states being attached to India by special treaties.

Prior to partitioning there was considerable controversy between the organized Hindu and Moslem parties as to how the independent subcontinent would be constituted. India preferred to leave the entire land area intact while the Moslems pressed for a separate nation of Pakistan. Both parties finally agreed to abide by the decisions of a British boundary commission. Agreement concerning Jammu and Kashmir, however, was not reached and remains a source of animosity between the two nations to the present.

Fig. 1.--General map of Pakistan; Pakistan location map.

Source: Albert Waterson, Planning in Pakistan (Baltimore: The Johns Hopkins Press, 1963).


PAKISTAN
LOCATION MAP
BURMA
TIBET
NEPAL
BHUTAN
EAST
JAMMU & KASHMIR
WEST
PAKISTAN
AFGHANISTAN
IRAN
INDIA
Bay of Bengal
Arabian Sea

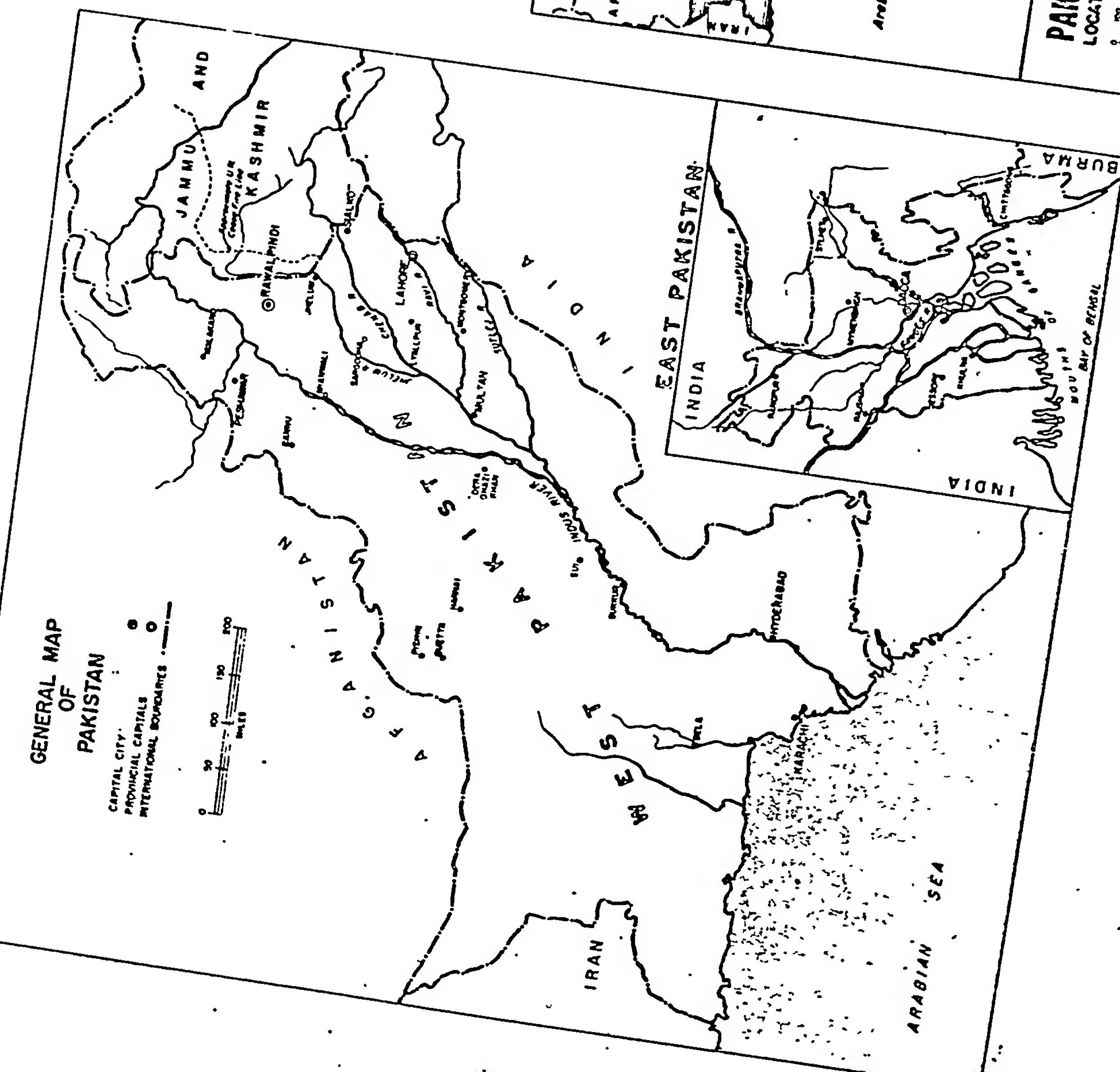
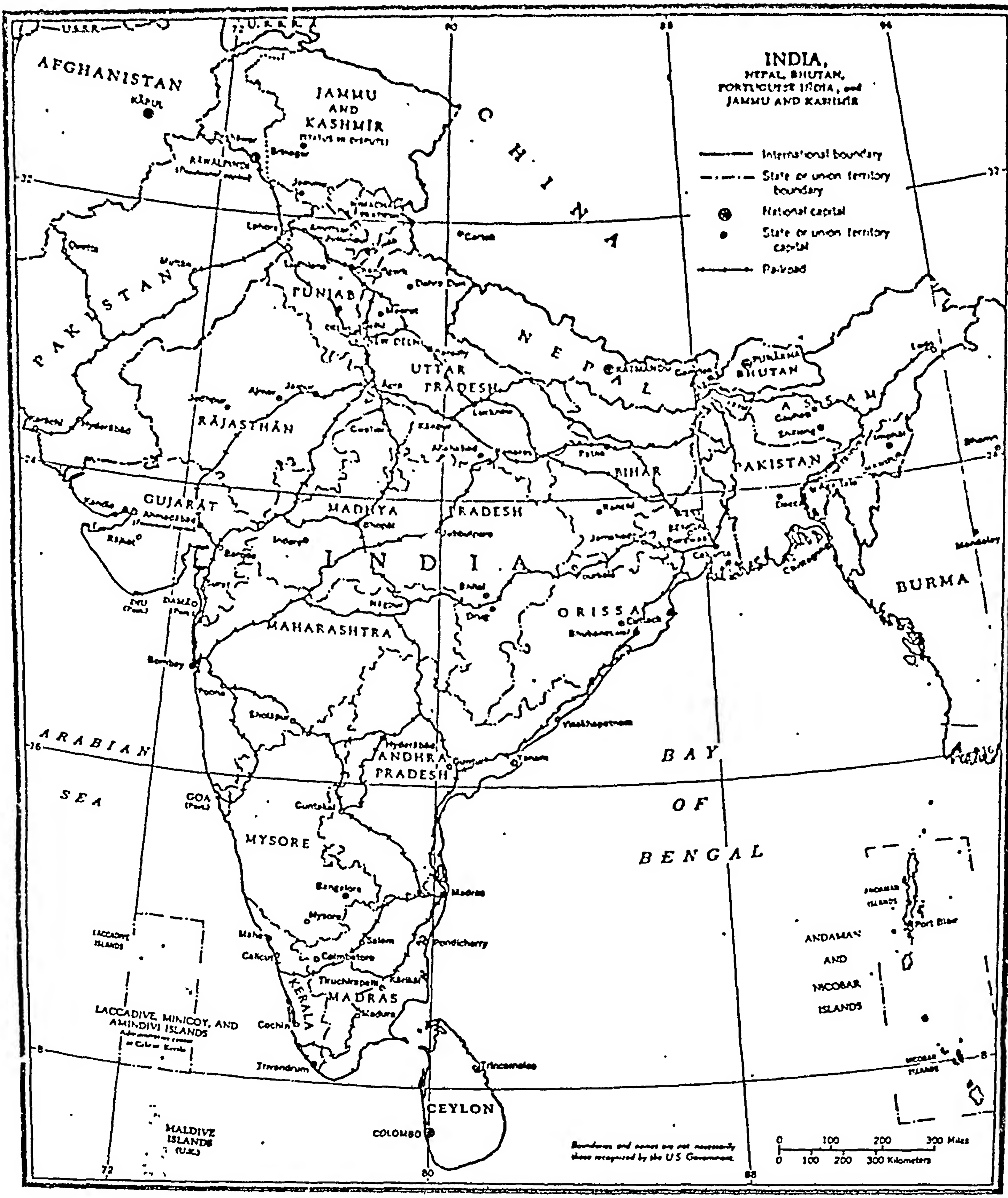

GENERAL MAP
OF
PAKISTAN
CAPITAL CITY
PROVINCIAL CAPITALS
INTERNATIONAL BOUNDARIES
MILES
JAMMU AND KASHMIR
RAWALPINDI
LAHORE
PESHAWAR
MULTAN
INDUS RIVER
HYDERABAD
KARACHI
WEST PAKISTAN
AFGHANISTAN
IRAN
INDIA
ARABIAN SEA
EAST PAKISTAN
INDIA
BURMA
BAY OF BENGAL

Fig. 2.--Map of India, Nepal, Bhutan, Portuguese India, and Jammu and Kashmir.

Source: United States Department of Commerce, Investment in India (Washington: U.S. Government Printing Office, January, 1961).


INDIA,
NEPAL, BHUTAN, PORTUGUESE INDIA, and JAMMU AND KASHMIR
International boundary
State or union territory boundary
National capital
State or union territory capital
Railroad
AFGHANISTAN
JAMMU AND KASHMIR
CHINA
PAKISTAN
PUNJAB
NEPAL
UTTAR PRADESH
BHUTAN
ASSAM
RAJASTHAN
BIHAR
PAKISTAN
GUJARAT
MADHYA PRADESH
INDIA
ORISSA
BURMA
MAHARASHTRA
ARABIAN SEA
BAY OF BENGAL
ANDHRA PRADESH
GOA
MYSORE
KERALA
MADRAS
CEYLON
ANDAMAN AND NICOBAR ISLANDS
LACCADIVE, MINICOY, AND AMINDIVI ISLANDS
MALDIVE ISLANDS (U.K.)
Bombay
Madras
Bangalore
Calcutta
COLOMBO
Trincomalee
Cochin
Trivandrum
Pondicherry
Port Blair
Boundaries and names are not necessarily those recognized by the U.S. Government.
0 100 200 300 Miles
0 100 200 300 Kilometers

Peninsular India may be described as a horst block, a fragment of the earth's crust dating back to the earliest geological time, the Archean or Pre-Cambrian period. This massive has remained remarkably stable over the millions of years as evidenced by the generally horizontal position of most of the rock-beds.

The peninsula, while generally not having been submerged to any great extent and having resisted structural disturbance over the years, has been subject to some vertical block movements especially during the Gondwana period. This occurrence was of considerable significance because the fissures which were formed became loaded with vegetable decay and other river sediment to form the presently known rich Gondwana coal deposits.[1]

The Deccan Plateau, which constitutes most of peninsular India except for the coastal fringes, is composed generally of crystalline and metamorphized rocks. These rocks are important economically because they are associated with mineral and metallic ore deposits and form the physical basis of the subcontinent's mineral wealth.

Some 200,000 square miles of the Deccan Plateau has been covered by lava beds. These flows, while covering the crystalline beds and deterring mineral exploitation, nevertheless form the basis of a thin rich black residual soil called regur which is important to cotton growing in the Gujarat and other regions.

With the exception of the now eroded Aravelli chain in Rajasthan which is one of the oldest systems in the world and some parts of the

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[1]Raye E. Platt (ed.), India, A Compendium (New York: American Geographical Society, 1962), p. 2.

Satpura range, the mountains of the peninsula are generally considered to be remnants of the old plateaus of Southern India.

The principal watershed of the peninsula is shaped by the Satpura mountains. Included in this drainage area are the Narabada and Tapti rivers, which are especially notable, since they are the two main peninsular rivers that flow west into the Gulf of Cambay on the Arabian Sea. Most of the other rivers of this watershed flow in other directions. The Son flows northeast toward the Ganga while the Weinganga and Wardha flow southeast and join other rivers.

An examination of the river drainage pattern reveals its general orientation toward the east. The easterly flow of these rivers is generally explained in terms of the slope of the plateau in an easterly direction. This helps to explain why such major rivers as the Krishna, Godavari and Cauvery, which have their headwaters in the Western Ghats just a few miles from the Arabian Sea, flow eastward across the peninsula into the Bay of Bengal. The Godavari, for example, flows for almost a thousand miles.

There is general agreement that drainage system of the peninsula has reached, for the most part, the mature stage of river development. This is characterized by the relative cessation of vertical erosion by the rivers and their low gradients.

Falls, however, do occur in peninsular India and provide some sources of hydroelectric power. The first hydroelectric power station in Asia was erected on the Cauvery at Sivasamudram, Mysore.[1] Other peninsular rivers are being harnessed in their upper reaches wherever

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[1] Platt, India, p. 7.

world to transverse, its continued effectiveness as an impediment to invasions by others is now in question, especially since the recent Chinese incursion.

The Himalayas constitute a series of parallel ranges which extend from the Assam-Burma mountains at a point near the bend of the Brahmaputra river which lies north of the Northeast Frontier Agency and across the northern part of the subcontinent to the bend of the Indus river in Jammu and Kashmir. They eventually link with the Afghanistan and Baluchistan ranges in the west. This represents some 3,000 miles of the highest and most rugged mountains on earth. Spate[1] observed that of the ninety-four Asiatic peaks which exceed 24,000 feet all but two are in the Himalaya and Karakoram regions.

These great mountain walls are in most respects the antithesis of the peninsular uplands.[2] This is a relatively youthful region that has been subject to an enormous amount of deformation in the past and remains unstable as the mountains are still presumably rising. Earthquakes also continue to characterize the region. This presently uplifted region has in past ages, unlike the peninsula, been successively overrun by the sea as evidenced by the different marine deposits identified in the strata.

The Himalayas are of extreme importance to the peoples of the subcontinent. Without the mountains the climate would be vastly different and extremely cold in the winter. The mountain walls intercept

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[1]O. H. Spate, India and Pakistan (New York: E. P. Dutton and Co., Inc., 1960), p. 15.

[2]Norton Ginsberg (ed.), The Pattern of Asia (Englewood Cliffs: Prentice-Hall, Inc., 1958), p. 489.

the cold winds of Tibet in the winter and likewise cut off the moisture-bearing winds from the sea during the monsoon season. This interception not only provides an immediate source of water-supply to the northern rivers but also replenishes the Himalayan glaciers with new snow. The glaciers, serving as sources for many of the rivers of the subcontinent, sustain the rivers and permit them to be perennial, thereby allowing greater utilization of them for purposes of irrigation and navigation.

The Indo-Gangetic lowland also owes its existence to the Himalayas since without them the deposition each year of many tons of alluvium by the river system could not take place. Unlike the peninsular rivers, the northern rivers are extremely active in vertical erosion and have cut gorges thousands of feet in depth. The Ganges and Indus rivers alone have been estimated to carry about 900,000 and 1,000,000 tons respectively of suspended matter daily.[1]

The third major earth feature is the Indo-Gangetic plain located between the extrapeninsular region and the southern plateau. This area constitutes a trough or basin that has long since been filled by alluvial debris by the river systems of the Indus, Ganges and Brahmaputra. The lowland is composed of the plains of these three river systems and appears to be almost completely flat throughout its extent.

The plain, some 300,000 square miles in area,[2] extends close to 2,000 miles from the mouths of the Ganges in East Pakistan to the mouths of the Indus in West Pakistan and forms an inverted V-shaped band of

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[1]Spate, p. 35.

[2]Government of India, India--A Reference Annual, 1955 (Delhi: Ministry of Information and Broadcasting, 1955), p. 3.

alluvium around peninsular India. The band varies in width from 90 miles in the east to 300 miles in the west.

The alluvium is classified as either newer alluvium called khadar or older alluvium named bhangar.[1] The bhangar deposits, which are associated mainly with the Ganges system, are found on slightly elevated ground which is not subject to the annual flood periods and located in the Bengal and Uttar Pradesh sections of the plain. The newer alluvium is found primarily in the channels of the rivers. This silt provides the basis for a very fertile soil.

The alluvial plains, while not containing any mineral resources, provide the clays needed for brick-making which is the main construction material used on the lowland. Calcareous concretions of kankar are commonly found in the older alluvium and are utilized in the production of lime, cement and road metal.[2]

The alluvial plains form the basis of most of the agricultural wealth of the subcontinent. This region can be described as the heart of the subcontinent because settled on these plains are over 200 millions people forming one of the most densely populated regions in the world.

Climate

The climate of the subcontinent is dominated by a system of moving air masses labeled monsoons. The seasonal shift of winds determines the seasonal rhythm of rain and influences the climate to such a degree that the climate is described as monsoonal.[3] The winds result from the

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[1]Wadia, p. 391.

[2]Ibid., p. 394.

[3]Ginsburg, The Pattern of Asia, p. 493.

higher pressure areas moving to those of lower pressure areas. Because of the mountain wall surrounding most of the subcontinent, the pressure systems of the Asian continent exert little or no effect on the systems of the subcontinent.

With the exception of most of West Pakistan which has a climate more characteristically continental,[1] the subcontinent annually experiences two monsoons. The seasons may be classified as follows:

1. The rainy season from June through September.
2. The cool season from October to March.
3. The hot season from March to June.

The seasons may also be divided in terms of the monsoons. The northeast monsoon has cool weather from January to February and hot weather from March to June while the southwestern monsoon has rainy weather from June through September with the October to December period marking the time of the retreating monsoon.

As the southwest monsoon and the center of the low pressure area retreat southward, the land winds become northeast. The northeast monsoon is, in contrast to the southwest monsoon, generally dry. Chhibber notes that, "The rainfall during winter is very small but it is of great economic importance for the production of wheat and other grain crops of a great part of Northern India."[2] However, parts of the Carnatic or eastern seacoast of the subcontinent receive twice as much rainfall during the winter as they receive during the summer monsoon season.

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[1]J. Russel Andrus and Azizali F. Mohammed, The Economy of Pakistan (Stanford: Stanford University Press, 1958), p. 12.

[2]Chhibber, p. 139.

The hot season of the northeast monsoon also marks the advent of the violent Nor'wester thunderstorms. The storms are associated with the Assam and Bengal regions of the subcontinent and generally assume a northwest to southeast direction. These squalls form quickly and are accompanied by rainfall, the amount of which is unpredictable and may vary from a small amount to twenty inches.

The storms are viewed as a mixed blessing by the people of the area. While the fates of the jute and aus paddy crops in Bengal and the tea crop in Assam depend on their occurrence, they are also capable of causing considerable damage.[1] This is especially true when the storms are accompanied by hail or when the winds reach a high velocity. In the drier northwest regions of the subcontinent similar squalls occur producing dust storms called andhis. In this case, very little of the rainfall actually reaches the soil.

The southwest monsoon is probably the more important of the two monsoons because it is the rain bearing wet monsoon . During the period from June to October about 75 per cent of the annual rainfall occurs over most of the subcontinent.[2] The importance of the climate, particularly the influence this season exerts on the people of the subcontinent, can not be overemphasized. To the millions of people depending on agriculture for their subsistence, the rainfall is of prime significance. Too little water may result in drought and bring famine. Too much water results in floods, damage to fields and crops and loss of life.

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[1] Nafi's Ahmad, An Economic Geography of East Pakistan (New York: Oxford University Press, 1958), p. 49.

[2] Platt, India, p. 24.

is the intensity of some of the downpours. Much of the water is lost in run-off and often results in flash floods. Before the recent addition of irrigation works, the Indian rivers carried 95 per cent of their annual flow out into the sea, and even under present plans, the amount of river water lost will continue to be over 80 per cent.[1]

Life in India and Pakistan seems to center around the monsoon season. Not only can it be a life and death matter to many people, its effect is also felt by business activities ranging from construction to transportation. It is an ingredient of the natural environment which has a decided influence on the inhabitants and their means of livelihood.

Soils

The soils of the subcontinent represent one of the region's most important natural resources. As the basic requirement of the all-important agricultural sector of the economy, the type and quality of th[illegible] help to serve or deter the sector's progress. This section will briefly present the main soil types, their extent, origin and relative deficiencies.

There are four main soil types found on the Indo-Pakistan subcontinent.[2] They are as follows:

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[1]Platt, India, p. 239.

[2]The present state of the knowledge on the subject of the subcontinent's soils is not comprehensive. The main types described here follow the traditional broad divisions used by a number of geographers as found in L. Dudley Stamp, Asia, An Economic and Regional Geography (New York: E. P. Dutton & Company, Inc., 1931), p. 183; also Cressey, pp. 443-445.

1. The alluvial soils which cover the Indo-Gangetic plains and the peninsular east coast river delta areas form the single most important type found on the subcontinent. The alluvial soils of the plains alone cover over 300,000 square miles. These soils are considered to be quite fertile and generally adequate in lime, potash and phosphoric acid. The alluvial soils of the peninsular region are also the result of river action on the old rocks of the peninsula and are generally lacking in phosphoric acid and nitrogen.

2. The regur or black soils are usually associated with the Deccan lava-covered areas of the peninsula, covering over 200,000 square miles of area. The black soils are the result of decomposition and disintegration of the underlying basalts. These soils have a clayey nature and are capable of retaining moisture for long periods of time. They are very fertile and found to be generally adequate in lime and potash but deficient in nitrogen, humus and phosphoric acid.

3. The red soils are the most extensive peninsular soil. These soils encompass some 800,000 square miles and are located mostly in the southern half of the subcontinent.[1] The soils are not all red in color, varying with the parent bedrock and local climatic conditions. They are associated with gneisses, granites and schists and are considered characteristic of tropical regions. The red color is received from the ferric oxide present. The fertility varies, with the upland soils being thinner and less fertile than the deeper soils of

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[1]Chhibber, p. 205.

the valleys.

4. The lateritic type of soil is developed from highly weathered, porous parent rock classified as laterite. This type of soil has not been well defined and is found capping the hills of the peninsular region. Wadia[1] believes that the laterite is largely a product of the monsoon regions with their alternating dry and moist conditions. This soil is generally considered to be a poor agricultural soil and is usually deficient in lime and magnesia. It can be summarized here that the subcontinent is well endowed with good quality soils whose productivity can be further enhanced through modern technological measures.

From this brief presentation on the geographical setting of the subcontinent, it is apparent that this area is one of contrasts. The climate has both desirable and deterring qualities, as do the main earth features and soils of the area. There exists a close relationship between man and the natural environment with deviations from the norm, as in the case of the monsoons, being usually disastrous. The people of the subcontinent, which number over one-half billion, live, in Cressy's words, "close to nature."[2] They have largely settled where the combination of natural conditions are most favorable for gaining a living which, in most instances, is agricultural. Three-fourths of the population are engaged in agricultural

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[1]Wadia, p. 512.

[2]Cressey, p. 446.

CHAPTER III

THE COMPLETED ECONOMIC PLANS OF INDIA AND PAKISTAN

The purpose of this chapter is to present the experience of economic planning that India and Pakistan have undergone in their completed five year plans. The discussion is intended to provide, through an examination of the economic policies, targets, investments and achievements, a background and some perspective for the following chapters which endeavor to analyze the role and importance of natural resources in the economic development of both countries.

At the time of independence, India and Pakistan were faced with general economic dislocation brought about partly by World War II and largely by the subsequent partitioning of the subcontinent. In instituting formalized economic development plans they endeavored to correct not only their immediate problems but also to lay the preliminary groundwork on which they hoped to lead their economies on a take-off to sustained economic growth. India, moving more swiftly, had completed two five year plans by 1960-61 while Pakistan was only to begin her second plan in 1960. The former nation began with the advantage of being a geographical entity and possessing more of almost everything, while the latter suffered from the handicap of being divided into two separated parts and having to start from a less advantageous base. While the whole of undivided India reasonably assumed it would be granted independence at some future time from the

Nehru, "We had not made any particular effort. We just took what was there and called it a Plan."[1] Nevertheless, the plan did set out both fiscal and physical targets to be achieved in the following five years and provided previously lacking coordination between the programs that had already been begun.

Going into the plan period the capital-output ratio was set at three:one. Assuming that the biological maximum of population growth is about three per cent a year,[2] a steady capital investment level of twelve per cent of national income would provide the breakthrough needed in the race with population growth for it would provide an increase of four per cent in national income.[3] India's population growth at this time was believed to be 1.25 per cent and her savings were estimated at the most to be about five per cent of national income. The level of investment was expected to rise to a 6.75-7 per cent rate by the end of the plan period. National income, which in 1950-51 stood at close to Rs. 9,000 crores,[4] was to increase by eleven per cent to Rs. 10,000 crores and per capita income of 1951-52 was to double in the next twenty-seven years.

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[1]P. J. Nehru in a speech before the National Development Council, September 1957, as cited in H. Venkatasubbiah, Indian Economy Since Independence (New York: Asia Publishing House, 1961), p. 296.

[2]Barbara Ward, India and the West (New York: W. W. Norton and Company, Inc., 1964), p. 25.

[3]United States experience in the 1870-1900, as cited in IFFYP, p. 14, revealed a three-fold increase in output with a capital formation rate of twelve to fifteen per cent; Japan's experience from 1900 to 1930 showed national income increased three times with investment running at about an average of fourteen per cent.

[4]One crore equals ten million; one lakh equals 100,000; Rs. represents the sign for rupee; one rupee equals $0.21.

The first plan officially began in April 1951, but was not completely formulated until 1952. Later it was to be revised with a view of overcoming some of the program lags of earlier years and providing additional employment. Working under the assumption that domestic savings would be increased by fifty per cent from the 1950-51 level of Rs. 350 crores to Rs. 675 crores in 1955-56, internal savings of Rs. 2,700 crores to Rs. 2,800 crores would be supplied for investment over the plan period. When withdrawals from sterling balances and other externally supplemental resources totaling together Rs. 800 crores are added to the expected domestic savings the aggregate target for investment for the first plan period was to be about Rs. 3,300 to Rs. 3,600 crores. The plan was expected to require Rs. 400 crores in foreign exchange.

Of the total investment the private sector was to provide Rs. 1,400 to Rs. 1,500 crores while the public sector would amount to about Rs. 2,069 crores. The public sector figure was later revised upward to a target allocation of Rs. 2,378 crores which was to be divided with the Center accounting for Rs. 1,390 crores and the State proposals equalling Rs.988 crores.

Allocation in the public sector called for following percentage distribution by major heads of development: agriculture and community development, fifteen per cent; irrigation and power, twenty-seven per cent; industries and minerals, eight per cent; transport and communication, twenty-four per cent; social services, housing and rehabilitation, twenty-three per cent. Agriculture along with the infrastructure sectors were to get the prime emphasis with industries and mineral

development getting less attention and expected to reach their individual targets mainly through the greater utilization of existing and hitherto unused capacity.

National income bettered its eleven per cent target and increased about 17.5 per cent over the plan period and per capita income increased 10.5 per cent (Table 1). While deemed satisfactory, the rate of increase of national income was not steady and about thirteen per cent of the increase was registered by the end of the third year. The large growth in 1953-54 and 1954-55 was largely due to expansion of agricultural production.

TABLE 1

NET NATIONAL OUTPUT FOR INDIA'S FIRST PLAN PERIOD
(Rs. crores at 1948-49 prices)

Item	1950-1951	1951-1952	1952-1953	1953-1954	1954-1955	1955-1956	Per cent Increase over 1950-51
Agriculture	4,340	4,440	4,600	4,980	5,030	4,980	14.7%
Mining, Manufacturing	1,480	1,520	1,580	1,650	1,700	1,750	18.2
Commerce, Transport & Communications	1,660	1,730	1,790	1,830	1,910	1,970	18.6
Other Services	1,390	1,430	1,590	1,570	1,640	1,720	23.7
Net Domestic Product at Factor Cost	8,870	9,120	9,470	10,030	10,280	10,420	17.5
Per Capita New Output (Rs.)	246.3	250.1	256.6	268.7	271.9	272.1	10.5
Population (Millions)	359.3	363.3	368.6	373.2	378.2	373	6.6

Source: Review IFFYP, p. 8.

The level of investment over the plan period was about seven per cent of national income in 1951-52, five per cent in the following two years, over six per cent in 1954-55 and 7.3 per cent in 1955-56, thus achieving the 6.75 to seven per cent target for 1955-56 but averaging out over the whole plan period to about six per cent of national income.[1]

Total investment over the plan period amounted to approximately Rs. 3,100 crores against the target of Rs. 3,500 crores with the private sector accounting for close to Rs. 1,600 crores and the public sector Rs. 1,500 crores. The public sector outlay as compared to the allocation show a shortfall of over Rs. 400 crores, a situation understandable in view of the plan having undergone expansion in later years and the various adjustments that had to be made (Table 2).

Of the public sector Rs. 1,960 crores expenditure realized, thirty-eight per cent of the total was met through taxation and railway surplusses, ten per cent from market borrowings, sixteen per cent from small savings and unfunded debt. Deficit financing accounted for twenty-one per cent and external assistance for ten per cent with other capital receipts making up five per cent. The growth of expenditure by years is indicated in Table 3 and reveals that about sixty-five per cent of total expenditure came in the latter part of the period. The investment-output relationship is by no means clear-cut as the figures reveal a diminishing rate of increase of production in the latter part of the plan while investment was expanding. The unclear relationship points up the contin ued dependence of the subcontinent on the monsoons as reflected by the increases registered in agricultural output for

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[1]Government of India, <u>Second Five Year Plan</u> (Delhi: Planning Commission, 1956), p. 3.

ratio worked out to be 1.8:1. This result reflected the good monsoons and the substantial increase of industrial production that occurred through increased use of idle capacity.

Agriculture and community development.--Programs in this sector received highest priority during the first plan period and were designed for further development of animal husbandry, dairying, forest, cooperatives, fisheries and especially, agricultural production. The allocations for agricultural extension activities, community projects and local development works were also slanted toward increasing agricultural production.

Targets were established on the assumption that certain results would be forthcoming if the various development programs were completed according to plan. A major aspect of the programs directed at increasing agricultural production concerned foodgrains production.

An increase of fourteen per cent was targeted for foodgrains. The anticipated increase of 7.6 million tons was to come from the following programs: two million tons from major irrigation, 2.4 million tons from minor irrigation, 1.5 million tons from land reclamation and development; 1.1 million tons from fertilizers and manures and an additional 0.6 million tons resulting from improved seeds. Foodgrain production over the plan period actually increased about twenty per cent rising from fifty-four million tons in the base period of 1949-50 to about sixty-five million tons in 1955-56. However, of the total increase about six to seven million tons must be attributed to favorable weather permitting good harvests and the rest may have been due to the

basic improvements intended by the programs.[1] Because the statistics needed to give a correct test of the agricultural programs are difficult to obtain as well as unsatisfactory when obtained, direct comparisons of target versus achievement are difficult to make. However, the shortfall was believed to be distributed under major irrigation fertilizers and manures, improved seeds, land reclamation and development.[2]

TABLE 4

INDIAN AGRICULTURAL PRODUCTION OF MAJOR COMMODITIES

Item	Base Year[a]	1951-1952	1952-1953	1953-1954	1954-1955	1955-1956	Target 1955-1956	Actual 1955-56 as per cent of Plan Target
Foodgrains (million tons)	54.0	51.2	58.2	68.8	66.6	64.9	61.6	143
Seeds (million tons)	5.0	4.9	4.7	5.3	6.2	5.6	5.4	156
Sugarcane (million tons)	5.6	6.1	5.0	4.4	5.8	5.8	6.3	35
Cotton (million tons)	2.9	3.1	3.1	3.9	4.2	4.0	4.2	82
Jute (million tons)	3.3	4.6	4.5	3.1	2.9	4.2	5.4	43

Source: Data adapted from Review IFFYP, pp. 14-17.

[a]1949-50 base year for food grains; all others 1950-51.

[1]See footnote in N. A. Khan, Problems of Growth of an Underdeveloped Economy (Bombay: Asia Publishing House, 1961), p. 308 and Venkatassubbiah, p. 310, in which the authors suggest that if all the programs had been completed, agricultural production would have been up by another six million tons.

[2]Ibid., p. 99.

Some ten million acres were to have benefitted from minor irrigation works but no net figures are available as some areas go out of irrigation on a periodic basis. The same problem of data compilation was encountered in trying to assess the impact of wells sunk and repaired. In the area of fertilizers and manures insufficient attention was paid to developing local manurial sources and utilizing them in conjunction with chemical fertilizers, developing workable distribution systems and the supply of agricultural credit. Very little was done with improved variety of seed and improved agricultural implements programs and the land reclamation schemes lagged considerably as most of the government reclamation operations were deemed uneconomic. No production targets were established for tea, coffee and rubber although all registered some gains over the period. The agricultural production programs had an allocation of Rs. 195.5 crores of which Rs. 181.2 crores were expended.

The animal husbandry programs of the first plan period mainly sought to bring about improvement in the cattle situation by establishing four key village units for every new artificial insemination center, by initiating rinderpest disease controls, setting up gosadans for old and useless cattle and expanding veterinarian education facilities and dispensaries. The targets and achievements are summarized in Table 5.

Very little progress was recorded in dairying and provision for balanced diet requirements of cattle. The gosadan schemes lagged due to inaction of State legislation, poor transportation arrangements and most of all, a lack of suitable land that could be set aside for this purpose. The years 1955-56 recorded the establishment of 192

TABLE 5

TARGETS AND RESULTS OF SELECTED INDIAN ANIMAL HUSBANDRY PROGRAMS

Item	Target	Actual
Plan expenditure	Rs. 22 crores	Rs. 16 crores
Artificial insemination center	150	144
Key village units	600	574
Gosadans	40[a]	25
Rinderpest vaccinations	-	55 lakhs
Scrub bulls castrated	-	37,500

Source: Review FFYP, pp. 127-130.

[a]Original target called for 160 gosadans but was later reduced. The term gosadans refers to land areas set aside, usually in remote forest areas, on which old cattle live out their lives.

veterinarian dispensaries and expansion of educational facilities to accommodate 823 more admissions to veterinarian colleges.

Of the Rs. 3.89 crores allocated for fisheries development, Rs. 2.78 crores were spent. While these programs suffered with delays in equipment deliveries and a lack of trained personnel, the targets were very modest and much below the estimated requirements of the country. The target of 1.5 million tons was not fulfilled as marketable surplus production amounted to only one million tons.

Forest policy inaugurated in the first plan period called for a long term program to increase the 1949-50 area under forest cover which stood at eighteen per cent of the total land area to thirty-three per cent of the total land area. The forest programs, which incurred a cost of Rs. 12 crores as against the allocation of Rs. 10.6 crores, included forest research, village plantation proposals, increased production of

species for forest industries and increased timber production schemes. A notable result of the forest programs was the construction and improvement of about 3,000 miles of forest roads that now allow all season accessibility to new forest areas and permit motorized timber delivery from the point of cutting to market places or rail points for transhipment.

At the beginning of the plan it was estimated that some 200 million acres of India were exposed to water and wind erosion and about 100 million acres of the cultivated land was vulnerable to erosion. Fifty million acres were accounted for by the western deserts where a portion of the land could benefit from afforestation and another fifty million acres were composed of hilly areas, ravines, pastures, et cetera, which could benefit from the traditional methods of gulley plugging, terracing and the like. By the end of the plan some 300,000 acres had received soil conservation treatment, about one-half of which included contour bunding. State programs contributed additional bunding of agricultural land.

India has chosen the community development projects and national extension services as the method through which to transform agrarian structure of its economy and to crack one of the so-called vicious circles encountered here, that is, farming cannot improve until the villages are upgraded and the villages cannot be upgraded until the farming improves.[1] Through these instruments it hopes to bring forth village leadership in an attempt to uplift the entire village environment. The

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[1] E. J. Russell, "Food Production Problems in India," International Affairs (January, 1952), p. 28.

programs encourage village cooperatives, the use of improved agricultural methods and attempt to mobilize local labor to meet common needs.

The plan called for the creation of development blocks each containing about 100 villages. The target was to bring some 120,000 villages under the program during the plan period and the entire rural area in about ten years. Each block was to have a block development officer, national extension officers for cooperation, agriculture and animal husbandry. Two social education organizers with a public health supervisor as well as ten village level workers each in turn responsible for ten villages made up the remainder of the administration. The programs were to be carried out in conjunction with existing village panchayats and cooperative societies.

The program, which began in 1952, had an allocation of about Rs. 100 crores of which Rs. 46 crores were expended with the value of the people's contribution estimated at Rs. 26 crores. By 1955-56 some 372 community blocks and 788 national extension blocks were set up covering over 157,000 villages and serving a population of almost eighty-nine million people. The shortfall of actual expenditure in relation tothe allocation is explained by the sharing of expenses by some of the States and that the original estimate was only a rough approximation of anticipated unit expenditure.

Because of the manner in which the organizations were established and the programs administered, no target versus achievement data are available and information of the impact of the programs on increased agricultural production is also unavailable. The variety and some of the results of the program are found in Table 7.

TABLE 6

DISTRIBUTION OF EXPENDITURE IN INDIAN NATIONAL EXTENSION AND COMMUNITY DEVELOPMENT PROGRAM, 1952-1956
(Rs. crores)

Item	Outlay 1952-1956
Animal husbandry and agriculture, land rehabilitation	4.26
Irrigation	7.34
Health and rural sanitation	4.52
Education and social education	4.60
Communications	6.64
Rural arts, crafts and industries	1.78
State and project headquarters	9.62
Housing (project staff and rural housing)	.36
Cost of imported equipment	4.30
TOTAL	46.02

Source: Review IFFYP, p. 113.

Agricultural education had to be strengthened to support the personnel needs of the expanded national extension services and the planned community development projects. During the period forty-four extension training centers were established and trained about 14,500 workers for village level work in agricultural training, extension, cooperation and associated activities. Fifty-four basic agricultural schools were begun; seven new group level training centers graduated about 1,850 supervisors for the various programs. Facilities at the agricultural college level were expanded to accommodate 380 more students.[1]

Irrigation and power.--This sector accounted for twenty-nine per cent of the total outlay of the first plan. Outlay amounted to

[1] Ibid., p. 102.

TABLE 7

SOME RESULTS OF THE INDIAN NATIONAL EXTENSION AND COMMUNITY DEVELOPMENT PROGRAM

Item	Quantity
Improved seeds supplied	176,666 tons
Chemical fertilizer supplied	335,285 tons
Fruit trees planted	157,000 acres
Vegetable cultivation	388,000 acres
New land cultivated	1.1 million acres
Additional land irrigated (minor works)	2 million acres
Pedigreed animals supplied	12,824
Constructed metalled roads	6,029 miles
Constructed unmetalled roads in village	38,000 miles
Improved existing roads	22,000 miles
Established new schools	15,000
Converted primary schools to basic type	6,968
Established adult education centers	41,000
Additional adults becoming literate	1 million
Established village panchayats, statutory bodies	11,451
Established ad hoc bodies	24,829
Established drinking wells	42,000
Renovated drinking wells	65,000
Established primary health centers	674
Established maternity and child welfare centers	578
Built rural latrines	110,000

Source: Review IFFYP, pp. 114, 115.

Rs. 585 crores out of the revised allocation of Rs. 647 crores. Installed electrical capacity of 2.3 million kilowatts in 1950-51 was to increase to 3.6 million kilowatts and the area irrigated was to increase from fifty-one million acres in the base year to 70.7 million acres by 1955-56.

The power schemes undertaken during the plan period brought an increase of 1.1 million kilowatts in installed capacity. The additional capacity was distributed in million kilowatts as follows: hydroplant, 0.38; steam plant, 0.68; and oil plant, 0.06.

The irrigation results are considerably less clear. The target of irrigation schemes under major and medium projects amounted to about 8.5 million acres with the remainder to be accounted for from minor irrigation. The results[1] reported by the Planning Commission were to be revised some time later as they did not represent actual or net area irrigated but potential thought to exist as a result of completed projects.

Quite a number of the projects were begun prior to the beginning of the plan and later various schemes were added. The Bhakra-Nangal, Hirakud, and Damodar Valley projects were already underway as the plan began with the Chambal, Kosi, Rihand, Koyna and Drishna projects starting up in December 1952. One year later a number of medium irrigation projects were started in areas of chromic scarcity and in late 1954 as a reaction to damaging floods, a number of flood control schemes were inaugurated. Rural and small town power facilities programs were begun in the same year to help alleviate unemployment. A total of 468 projects were started during the entire plan period.

Industries and mining.--As part of the Indian policy to reduce inequalities in their economy, it was decided that the public sector would be widened and that the private sector would come more and more under the direction and control of the government. Indian philosophy concerning the industrial sector was revealed in the Industrial Policy Statement of 1948. It laid down that munitions, atomic energy and railway transport would be operated as monopolies of the Central

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[1]The incorrect reported results showed about 16.8 million additional acres brought under irrigation with the increase divided by major and medium schemes and minor works as 6.8 million acres and 10 million acres respectively.

Government and that the State would be exclusively responsible for further new undertakings in the basic industries of coal, iron and steel, shipbuilding. However, should the State deem it necessary, private cooperation would be sought. The rest of the industrial field was left open to private enterprise.

As far as the first plan was concerned, the industries and mining public sector of the economy was almost ignored, representing only about five per cent of the total actual expenditure. Small and village industries' actual expenditure amounted to Rs. 43.7 crores out of a planned allocation of Rs. 49.5 crores. Khadi and handloom industries received the major emphasis by the Central Government with encouragements provided by reserving some types of cloth for handloom operations, levying of excise duties on mill made dhoties, restricting mill loom capacity and providing subsidized electric power to some village enterprises. The village industries assisted during the plan ranged from handmade paper and matchmaking to bee-keeping and village leather.

Public sector expenditures of Rs. 56 crores were incurred for large scale industries, mining and scientific research out of a planned Rs. 138 crores. The physical achievements and shortfalls of the various Central and Government industrial endeavors are found in Table 8.

Investment by the private sector in industries and mining was envisaged to be conside-ably larger thanthe public sector amounting to Rs. 233.3 crores. The target was achieved as Rs. 232.9 crores were incurred. The pattern of investment in the private sector revealed the metallurgical industry, petroleum refining, and electrical power

TABLE 8

INDUSTRIAL DEVELOPMENT IN THE INDIAN PUBLIC SECTOR

Project	Unit	Target 1955-56	Actual 1955-56	Per cent Achieve-ment
Central Government				
First integrated steel works	tons	Not fixed	-	-
Hindustan shipyard	G.R.T.	20,000	13,000	65%
Hindustan machine tools	units	200	17	9
Sindri fertilizer	000 tons	315	326	103
Hindustan antibiotics	mil. Meg. units	4.8	6.6	138
Hindustan cables	miles	470	525	112
Hindustan insecticides	tons	700	284	41
Chittaranjan Locomotives	units	92	125	136
Integral coach factory	units	50	20	40
Indian telephone industries	000 units	50	50	100
	000 exchange lines	35	35	100
State Governments				
Mysore iron and steel works				
Steel	000 tons	100	35	35%
Pig Iron	000 tons	100	52.4	52
Cement	000 tons	90	76.8	85
U.P. Gov't. Cement Factory	000 tons	200	260	130
NEPA Mills (newspring)	000 tons	30	4.2	14
Bihar Gov't. Super-phosphate	000 tons	13.5	-	-

Source: Review IFFYP, pp. 200, 201.

generation and distribution industry accounting for over one-half of the investment followed by sizeable investments by the light and heavy engineering, cotton textiles and cement industries.

The overall results in the industrial sector, both private and public, saw industrial production increased by about thirty-eight per

cent. Capital goods production rose seventy per cent with consumer goods and intermediate goods including raw materials both registering a thirty-four per cent increase in output.[1]

TABLE 9

INDIAN PRODUCTION OF SELECTED INDUSTRIAL COMMODITIES

Item	Unit	Target 1955-56	Actual 1955-56	Per Cent Achievement
Cotton cloth	mil.yds.	4,700	5,102	108.5%
Cotton yarn	mil.lbs.	1,640	1,640	100
Jute manufactures	000 tons	1,200	1,054	87.8
Steel[a]	000 tons	1,600	1,276	79.8
Cement	000 tons	4,800	4,592	95.7
Sugar	000 tons	1,500	1,701	113.4
Ammonium sulphate[a]	000 tons	450	394	87.6
Paper & paperboard	000 tons	200	187	93.5

Source: Khan, p. 311.

[a]Production includes public output.

Transportation and communications.--After irrigation and power this sector received the greatest emphasis in the first plan and accounted for 26.4 per cent of the total outlay. Railways received about one-half of the expenditures with road and road transport accounting for over one-fourth of the outlay.

The railways of India are government owned and constitute the country's largest national undertaking. World War II damage and increasing demands for railway services created a situation that required immediate attention toward rehabilitating the system. It was estimated that about one-third of the rolling stock was over-aged.

[1]Review IFFYP, pp. 5, 182.

TABLE 10

ALLOCATIONS AND OUTLAY IN INDIAN
TRANSPORT AND COMMUNICATIONS
(Rs. Crores)

Item	Provision	Actual	Per cent of Total Plan Expenditure
Railways	267	267	13.3%
Roads and road transport	147	147	7.3
Parts, harbors, shipping and other transport	97	71	3.5
Posts, telegraphs, communications and broadcasting	60	47	2.3
TOTAL	571	532	26.4

Source: Review IFFYP, p. 334.

While most of the new equipment was imported from abroad, about one-third of it was produced in the country by both the private and public sectors. Between 1951-52 and 1955-56 Indian production of wagons increased from 3,707 to 14,317; locomotives from 27 to 179 and coaches from 673 to 1,221. During the plan period 380 miles of new lines were built, 480 miles were restored. While the volume of railway traffic handled increased from 91.4 million tons in 1951-52 to 114.1 million tons at the end of the plan period, it still did not satisfy the demand which was estimated to be 120 million tons.

In road development, the Nagpur Plan established in 1943, was followed. The scheme called for the development of roads to the extent that by 1963 no village located in a well-developed agricultural area would remain more than five miles from a main road and in any other area not more than twenty miles from a main road, thus providing needed

road links and increasing village contact with marketing centers. During the plan period the broad target of total road mileage was about one-third achieved with 10,000 miles of surfaced roads constructed and about 20,000 low type or kutcha roads built in the rural areas where many were built by the people themselves who gave their labor and money and paid for from one-third to one-half of the cost of the roads.[1]

Because of lack of capital, restrictive taxes, various State controls and the threat of nationalization of the goods transport sector, the motorized road transport did not develop commensurately with the results in road building and needs of the country. In 1953 the Planning Commission recommended that this transport sector not be nationalized during the current or the second plan period and that licensing policy and regulations be liberalized to encourage private enterprise. The number of motor vehicles on the road increased from 306,000 to 415,000 during the plan period.

In shipping India has only 0.5 per cent of the world's tonnage. The plan target was to spend Rs. 26.3 crores and add 215,000 GRT to the existing 390,707 GRT. The actual outlay was Rs. 18.7 crores and the total tonnage at the end of the plan stood at 480,000 GRT divided equally between coastal and overseas ships. A marine college was also established during the plan period and about 6,000 officers and rated personnel were trained by the government.

Some Rs. 37 crores were allocated for ports and harbors, and of the Rs. 27.5 crores actually expended Rs. 23 crores went for expanding the facilities of Kandla, Bombay and Calcutta. The total capacity of all the major ports rose from twenty to twenty-five million

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[1]Government of India, Planning Commission, The New India (New York: The Macmillan Company, 1958), p. 307.

tons with the volume of traffic increasing from eighteen to twenty-two million tons over the plan period. Development expenditure of minor ports, of which 150 of the total 226 are classified as working ports, amounted to Rs. 2 crores. The traffic handled by these working ports increased from 3.7 million tons to 4.2 million tons during the plan.

Inland water transport has been considered only of local importance. The overburdened railway system has caused the planning authorities to investigate the potential of the existing 5,000 miles of navigable river routes. Rs. 3 crores was allocated for craft experimentation and development of the two canals.

India's air services were nationalized in 1953. The target outlay of Rs. 9.5 crores was overexpended by Rs. 6 crores to provide for additional ground facilities and modification of aircraft. The total unduplicated route mileage service increased from 17,170 miles in 1953 to 19,185 miles at end of plan period.

In the communications section the plan allocated Rs. 50 crores for posts and telegraphs with the actual outlay being about Rs. 40 crores. The number of local telephones increased from 168,000 to 277,600, the number of post offices rose from 36,000 to 54,900 and the number of telegraph offices operating went from 3,592 to 5,057.

Overseas communications progress was accomplished with direct radio-telegraph service rising from four to fourteen countries, radio-photo services increasing from two to five countries and radio-telephone services rising from four to fifteen countries.

Some 14,000 community radio sets were installed during the plan to provide facilities for rural listening which in the past was negligible. Twenty-eight transmitters of various power degrees were installed.

Social services.--This sector accounted for twenty-one per cent of the actual outlay during the first plan with education, health and rehabilitation receiving the major emphasis.

TABLE 11

ALLOCATION AND OUTLAY IN INDIAN SOCIAL SERVICES
(Rs. Crores)

	Provision	Actual	Per cent of Total Plan Expenditure
Education	170	153	7.6%
Health	138	101	5.0
Housing	49	35	1.7
Labor, welfare, backward classes	39	37	1.8
Rehabilitation	135	97	3.7
TOTAL	531	423	21.0

Source: Review IFFYP, p. 335.

In the important area of education the number of primary schools increased from 209,700 to 280,000 with the number of basic schools increasing from 1,751 to 15,800. The number of children aged six to eleven years attending school rose from 18.7 million to 24.8 million; ages eleven to fourteen increased from 3.4 to 5.1 million; ages fourteen to seventeen went from 1.5 to 2.3 million students. In terms of total schools on an urban and rural basis the schools in urban areas increased from 232,000 to 300,000 and in the rural areas from 189,000 to 255,000 schools.

The plan, despite some of the shortfalls noted, has been widely acknowledged as being a success. The balance of payments presented

hardly any problem during the period and as inflationary pressures were controlled the income rise was not offset by a rise in prices. The increase in investment during the plan period did not cause undue strain on domestic price level or on the balance of payments due to the considerable rises in agriculture and industrial production registered during the period. Prices at the end of the plan were thirteen per cent lower than at the start of the plan and even lower than the pre-Korean level and the all-India cost of living index was at an average level of ninety-six compared with one hundred in 1949.[1]

India's Second Five Year Plan[2]

The second plan could be considered as a continuation of the first plan, but a number of important differences are evident. While the new plan similarly called for a greater increase in per capita and national income, its size was larger and emphasis on the various sectors changed. The goal of the socialist pattern of society was propounded with social gain being stressed. Creation of new job opportunities, reduction of concentrations of economic power and disparities in income and wealth were also listed as broad aims.

The role of government in business was to expand. Where in the first plan the amount of investment was about equally distributed, the second plan envisaged about sixty per cent of the total allocation coming from the public sector where a decided stress was to go on heavier basic industries. These the government felt were essential for early

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[1]ISFYP, p. 5.

[2]Much of the statistical data presented in this section comes from the following Indian government sources: Government of India, Second Five Year Plan (Delhi: Government of the India Press, 1956), hereafter cited as ISFYP; Government of India, Third Five Year Plan (New Delhi: Government of India Press, 1963), hereafter cited as ITFYP.

development and the new endeavors were to be reserved for the public sector. Existing private concerns in certain of these industries would be allowed to expand their immediate facilities.

Size of the second plan would be about double that of the first plan with the total investment of Rs. 6,200 crores being divided between the public sector expectation of Rs. 3,800 crores and Rs. 2,400 crores to be invested by the private sector. National income was to increase by twenty-five per cent with per capita income expected to increase by about eighteen per cent based on an estimated annual rate of population growth of less than 1.3 per cent.

The annual rate of investment was to rise from seven per cent recorded in 1956-57 to over eleven per cent in 1960-61. Overall consumption would increase about twenty per cent with per capita consumption rising some twelve per cent. The anticipated increase in total national income would be on the order of Rs. 2,680 crores, thus providing a capital-output ratio of 2.3:1.

The ratio was higher than the previous plan's 1.8:1 ratio due to the shift in emphasis towards industrialization. It was recognized that other countries' past experience showed considerable variations and that the ratio for the whole economy could provide only a rough estimate of the productivity of capital of different sectors. In addition, the productivity was dependent not only on the amount of capital employed but also on such factors as the associated technology, the manner in which the new capital goods were handled, the quality of administration, the composition of the investment, as well as on the degree of utilization of the economic overheads being provided. India's non-monetized portion of investment was not included in the calculations.

The second plan underwent a number of adjustments, having first been increased and later decreased to a so-called core level of about Rs. 4,500 crores (Table 12). While the individual sectors were allocated appreciable increases in outlay over the first plan, a decided shift in emphasis occurred. The relative share of total outlay in the second plan for agriculture - irrigation and power sectors fell from fifteen per cent and twenty-seven per cent to twelve per cent and nineteen per cent, respectively, while the transport and communications and industries and mining sectors rose from twenty-four per cent and eight per cent to twenty-nine per cent and nineteen per cent, respectively.

TABLE 12

PROJECTED TOTAL INVESTMENT AND OUTLAY IN INDIA'S SECOND PLAN
(Rs. Crores)

Item	Original Plan				Revised Plan 5-1958
	Investment Outlay	Current Outlay	Total Outlay	% Increase over First Plan	Estimated Outlay
Agriculture and Community Development	338	230	568	59.1%	510
Irrigation and Power	863	50	913	38.1	820
Industries and Mining	790	100	890	397.2	950
Transport and Communications	1,335	50	1,385	148.7	1,340
Social Services	455	490	945	77.3	810
Miscellaneous	19	80	99	43.5	70
TOTAL	3,800	1,000	4,800	103.7	4,500

Source: <u>ISFYP</u>, p. 65 and Venkatassubbiah, p. 315.

The overall absolute increase in investment in the industrial and mining sector was to rise by almost 400 per cent. This large push reflected

India's belief that her future lay in industrialization and that the heavy basic industries base had to be built as rapidly as possible if her long-view goal towards a balanced economy was to be realized.

While a specific target of job creation was not provided in the first plan some 4.5 million jobs were generated. However, the unemployment roll at the end of the plan stood at about 5.3 million. Of these, 2.8 million were located in urban areas and the remaining 2.5 million persons in the rural areas.[1]

The goal set for new job opportunities in the second plan was about eight million and was accounted for in millions as follows: trade and commerce, 2.7; construction, 2.1; industries and minerals, .75; small industries, .45; forestry, fisheries and allied schemes, .41; government services, .45; all others, 1.1.[2] While the goal is commendable, the extent of the unemployment problem is still very large for the new entrants into the ranks of employable population were expected to be about ten million during the five year period. Coupled with the backlog of 5.3 million persons, the need for new job opportunities stood at about 15.3 million. Of this total, some two million of the people are termed educated; however, only one and one-half million jobs were expected to open up for them.

A combination of factors brought about plan implementation difficulties very early in the second plan. Two poor harvest years, increasing prices, foreign exchange resource depletion and disappointing

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[1]These figures should be treated as very rough estimates for reliable total unemployment figures are unavailable.

[2]<u>ISFYP</u>, p. 115.

tax receipts all contributed to the problems experienced. The plan was revised in two parts with Part A calling for an outlay of Rs. 4,500 crores. Table 12 reflects the manner in which the various sectors were affected. Part B included projects which could be deferred and implemented if the opportunity arose. Foreign exchange priorities went to heavy industries, transportation, coal mining and those projects which were deemed essential and which were in an advanced stage of construction.

The financial resources for the revised plan were to be accounted for by Rs. 150 crores from the railways, Rs. 850 crores from current revenues, Rs. 1,300 crores from small savings and loans, Rs. 1,100 crores from external sources and about Rs. 1,150 crores from deficit financing. National income increased by twenty per cent over the plan period falling short of the anticipated goal of twenty-five per cent. Per capita income rose by about eight per cent as opposed to the target of eighteen per cent as the rate of population growth assumed at the beginning of the plan proved to be incorrect.

Table 13 details by sector the outlay and investment by the public sector as well as the investment by the private sector reflecting a total actual investment of about Rs. 6,750 crores as opposed to the original goal of Rs. 6,200 crores. The wholesale price index (1952-53 = 100) rose from 105.6 in 1957 to 127.5 in 1961 for an average of 113.7 for the five year period. Based on the revised estimating basis, the Rs. 700 crores difference between the original Rs. 2,400 crores and the stated total of Rs. 3,100 crores was taken to be the non-monetized portion of investment thus giving a total monetized figure of Rs. 6,050

TABLE 13

TOTAL OUTLAY AND INVESTMENT FOR INDIA'S SECOND YEAR PLAN BY SECTOR
(Rs. Crores)

Item	Public Sector Outlay Target	Public Sector Outlay Per Cent	Public Sector Outlay Actual	Public Sector Outlay Per Cent	Public Sector Investment Target	Public Sector Investment Actual	Private Sector Investment Target	Private Sector Investment Actual
Agriculture and Community Development	568	11.8%	530	11%	338	210	-	625
Irrigation and Power	913	19.0	865	19	863	865	-	40[a]
Industries and Mining	890	18.5	1,075	24	790	960	-	850
Transport and Communications	1,385	28.9	1,300	28	1,335	1,275	-	135
Social Service and Miscellaneous	1,044	21.8	830	18	474	340	-	950
Inventories	-	-	-	-	-	-	-	500
TOTAL	4,800	100	4,600	100	3,800	3,650	2,400	3,100[b]

Source: ISFYP, p. 56; ITFYP, pp. 58, 59.

[a]Includes power only, irrigation investment included in agriculture.

[b]Excludes transfers from public to private sector.

crores or about $12.7 billions for the second plan time span.[1]

The capital-output ratio over the plan worked out to be about 3.1:1. The rate of investment reached a level of eleven per cent of national income by the end of the plan and a domestic savings level of 8.5 per cent.

Agriculture and community development.--While the amount of outlay proposed for this sector is considerably larger in absolute terms over that allocated in the first plan, the sector's relative share of the total plan declined reflecting the shift toward the industrial and transport segments of the economy. Successes in the agricultural sector during the first plan such as overall agricultural production going up by fifteen per cent,probably contributed to the buoyant attitude of the planners at the beginning of the second plan and produced such statements as, "It is no longer necessary to place a dominant emphasis on the production of cereal crops. The aim now must be to diversify agricultural production. . . .'[2] This optimism unfortunately was to be dampened by future events.

The second plan anticipated an increase in agricultural production of eighteen per cent. The earlier started programs of increased fertilizer application, improved seeds, irrigation use and better methods of farming were to be continued. Diversification was to come through the added emphasis on cash crops and so called subsidiary foods as

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[1]W. Malenbaum, Prospects for Indian Development (Glencoe: The Free Press of Glencoe, Inc., 1962), p. 249.

[2]Government of India, Planning Commission, Second Five Year Plan, A Draft Outline (Delhi: Government of India, February, 1956), p. 90, hereafter cited as ISFYP, Draft Outline.

fruits, vegetables, fish, eggs, meat and dairy products as well as expanded land reform programs initiated earlier.

Foodgrain production was to increase fifteen per cent going from sixty-five million to seventy-five million tons by 1960-61, resulting in an increase of daily per capita adult consumption of foodgrains from 17.2 ounces to 18.3 ounces. The ten million ton increase was expected to come from the following measures in terms of million tons: major irrigation 2.4, minor irrigation 1.8, manures and fertilizers 2.5, improved seeds 1, land reclamation and development 0.8, improved techniques 1.5. Anticipated production increases in other important agricultural segments included a rise of nine per cent in tea, a twenty-seven per cent increase in oilseeds, a twenty-two per cent rise in sugar cane and a thirty-one per cent and twenty-five per cent increase in cotton and jute production, respectively. These types of agricultural programs were to entail an outlay of Rs. 170 crores..

These targets were to be revised upward in the latter part of the first year of the plan. The actual production figures of major agricultural commodities versus the revised targets showed production shortfalls in all of the commodities categories except sugar cane (Table 14).

Aside from the acknowledged stagnation in cotton and jute, the shortfalls registered in most of the categories did not appear to be very significant. However, an underestimation of about thirty million persons in the population growth over the five year period served to magnify the problem. Self-sufficiency was not maintained and large food imports were incurred. The miscalculation coupled with two poor

TABLE 14

AGRICULTURAL PRODUCTION OF MAJOR COMMODITIES IN INDIA's SECOND PLAN

Item	1949-1950	1956-1957	1957-1958	1958-1959	1959-1960	1960-1961	Target
Foodgrains (million tons)	57.6	68.6	62.5	75.5	71.7	76.0	80.5
Oilseeds (million tons)	5.1	6.3	6.1	6.9	6.4	7.1	7.6
Sugarcane (million tons)	4.9	6.8	6.9	7.1	7.6	8.0	7.8
Cotton (million bales)	2.6	4.7	4.7	4.7	3.8	5.1	6.5
Jute (million bales)	3.1	4.3	4.1	5.2	4.6	4.0	5.5
All Commodities (index number)	100	124.0	114.6	132.3	127.2	135	-

Source: ITFYP, p. 302.

harvest seasons made necessary the import of twenty million tons of food as compared to a planned six million tons. The situation served to aggravate an already existing foreign exchange problem which prompted the adoption of a stricter import policy calling for a system of exchange allocations on a six months basis.

Animal husbandry programs of the second plan were largely a continuation of those instituted during the first plan with emphasis on increasing the number of key village units, artificial insemination centers, cattle protected from rinderpest, gosadans and veterinary dispensaries and related educational facilities.

These programs, together with the dairy and milk improvement schemes, received an allocation of Rs. 56 crores of which Rs. 17.4 crores was to be expended by dairying and the remaining Rs. 38.4

crores by animal husbandry. The actual outlay for animal husbandry was Rs. 21 crores and for dairying Rs. 12 crores.

The target of 1,900 added veterinary dispensaries was met. Some 2,000 new key villages were established as compared with the target of 1,258 and 670 new artificial insemination centers were set up as against the targeted 245. By the end of the second plan about ninety million head of cattle were protected from rinderpest leaving a balance of forty-one million head unprotected. Thirty-four additional gosadans were set up and 246 goshales were selected for development to produce superior bulls.

Progress in dairying and milk supply was slower. Thirty-five dairy plants for major consuming areas, twelve rural cooperative creameries and seven milk drying plants were to be established during the plan period. Foreign exchange shortages and some foreign equipment and plant delivery precluded achieving desired results. Most of the programs that were completed were supplied by equipment indigenously produced or those by capital equipment from abroad were provided for in foreign aid programs. Only eight dairy plants were completed and about twenty others are in varying stages of development. Three creameries were built and two milk product plants established. The policy calling for development of greater milk production in farm areas with the surplus being marketed to urban areas through the medium of village producers' cooperatives has yet to be implemented on an appreciable scale.

Fisheries development progress continued to be very modest. Only Rs. 12 crores were allocated for these programs of which Rs. 9 crores were actually spent. Fish production continued to lag with the

increase over the five year period amounting to only 0.4 million tons for a total of 1.4 million tons in 1960-61. Over a ten year period the registered increase in fish production has only been 0.7 million tons.

Some 1,800 boats were mechanized by the end of the second plan, thus allowing the fishermen to extend their fishing to about fifteen to twenty miles from shore as compared to the previous three miles. Refrigerated railroad cars are only in the experimental stage and the great potential that India has in fisheries development has yet to be realized.

By 1960-61 India's forest cover stood at about twenty-two per cent of the total land area or about eleven per cent short of the long range goal of thirty-three per cent. Approximately Rs. 19.3 crores were expended on forestry and Rs. 18 crores on soil conservation programs during the second plan. Over the past ten years stress has been laid not only on the productive but also the protective functions of forests. India suffers a shortage of wood, both industrial and for fuel,and as the population increases and literacy rises the demand will be expected to increase.

During the two plan periods surveys have been made, maps prepared, plantations of fast growing species set up, communications extended and preservation processes of inferior species introduced. Matchwood timber now accounts for 55,000 acres and industrial timber covers 330,000 acres. Some 400,000 acres of degraded forests were rehabilitated and about 9,000 miles of forest roads have been built. Further successes in this sector would not only overcome inaccessibility problems, but could also contribute to agricultural production by freeing large quantities of dung for fertilizer that are burned annually to

take the place of unavailable fuelwood.

In the soil conservation schemes previously started work on afforestation, contour bunding, terracing and ravine reclamation continued. Training of officers and assistants in soil conservation methods has also continued. About forty demonstration farms have been established for the purpose of promoting dry farming techniques. Some 140,000 acres were put under soil conservation treatment in the catchment areas during the second plan and about 1,800 acres of sand dunes were stabilized.

The community development program, it will be remembered, was picked as the method to effect the needed changes in the social and economic life of the villages and the national extension service was the agency through which the transformation was to occur. During the second plan various changes took place in the overall program, but the basic purposes of increasing agricultural production, developing cooperatives and village industries, providing facilities for primary education and providing a program for rural water supply and village roads remained the same. The intent was to bring about greater utilization of rural manpower and resources for development of the rural areas and at the same time to instill a sense of participation and desire on the part of the villagers to want higher standards in their lives and to work toward these goals.

About Rs. 227 crores were provided in the second plan for the work of community development as well as village panchayat development and local development works to provide subsidiary employment in the slack seasons. The actual outlay for these projects amounted to Rs. 218.7 crores and by the end of the plan period the total program consisted of 3,100 development blocks covering 370,000 villages.

During the plan period the phasing manner of the national extension service projects and the community development projects was changed. Prior to the change a portion of extension projects would move into the community development sphere after about a two year period. This was changed whereby a single scheme of community development was adopted now to be spread over two stages, each comprising five years. By 1960-61 some 880 development blocks had completed five or more years.

The next major development that occurred in this area of activity was the introduction of Panchayat Raj which called for the establishment of democratic institutions at the district and block levels. The Zila Parishad at the district level and the Panchayat Samiti at the block level together with the Gram Sabha or village assembly, the village Panchayat or village council and village cooperatives form the structure of the development administration within a district.

The responsibility of implementing rural development projects now rests with the Panchayat Samiti and it is at this organizational point where most of the technical knowledge and assistance by the previously established government Block Development and Extension Services officers will be provided.

The other important change occurring in community development has the district and block serving as the planning unit which, with the cooperation of the village units, is expected to submit proposals to the state level for consideration for inclusion in the national plan. This procedure also should result in greater participation in planning and provide the villagers with more identification with the national plans that are ultimately adopted. It is too early to evaluate the im-

pact of these changes. While additional layers of administration provid an outlet for greater democratic participation and service, the most important work rests at the village level where the quality of advice and leadership as well as the response of the villagers will spell success or failure of the programs.

Irrigation and power.--The Rs. 913 crores allocated to this sector represented a sizeable increase over the first plan, but its relative share of the total outlay shrank to nineteen per cent of the plan as opposed to the first plan's 28.1 per cent. Planning policy call for a better balance between major and medium sized projects than was possible in the first plan which had a number of large projects underway at the time of its initiation. The second plan also tried to achieve wherever feasible a balance between the different regions of the nation. The stress was to be on medium-sized projects which would yield quicker results and spread the benefits more evenly across the country.

The area irrigated was to increase by twenty-one million acres and reach a total of eighty-eight million acres by the end of the plan. Twelve million acres were to be accounted for by major and medium projects with nine million acres expected to be added by minor projects. Of the former some nine million acres would be the result of projects undertaken in the first plan and the remaining three million acres would come from current programs. The power target anticipated installed electrical capacity to increase from 3.4 million kilowatts in 1955-56 to 6.9 million kilowatts.

The target of an additional 3.5 million kilowatts was not achieve as the added capacity amounted to only 2.28 million kilowatts. The

increase was distributed in millions of kilowatts in the following manner: hydro plant, 0.99; steam plant, 1.19; oil plant, 0.10. Reasons for the failure to achieve targets were foreign exchange problems and delays in the completion of a number of projects. Power shortages required certain projects to be removed from the earlier designated non-core category to core status. Some Rs. 445 crores were expended on power development as against the original estimated outlay of Rs. 427 crores. Over the past decade there was a total investment on power of Rs. 1,017 crores of which State-owned public utilities accounted for Rs. 790 crores.

Expenditure on irrigation schemes amounted to Rs. 370 crores as compared to the programmed Rs. 381 crores. The difficulty mentioned earlier in compiling the results of irrigation projects in the first plan became quite obvious when the final results of the second plan were tabulated. Based on additional information and further elaboration in statistical reporting, the figures for the first plan results were revised sharply downward. While the twelve million acres target for medium and major projects was reduced to 10.4 million acres in 1958, the actual increase in the second plan amounted to about 6.1 million net acres. Thus, the actual net area irrigated stood at seventy million acres in 1960-61 as opposed to the target of eighty-eight million acres. The target for the third plan is ninety million acres or only two million more acres than the anticipated total for 1960-61 (Table 15).

The reasons for the shortfalls are numerous, ranging from inadequacy of technical personnel to shortages of materials such as coal, steel and cement. Due to local and regional pressure some projects had not received adequate planning before commencement. Wage and cost increases cut down on anticipated physical results. Inattention to the

preparation of the villagers for the advent of irrigation to their areas as well as the villagers' failure to provide field channels to their fields held up the fruition of benefits as some projects were not utilized upon their completion.

TABLE 15

AREA IRRIGATED IN INDIA
(million acres)

Type	1950-51	1955-56	1960-61	1965-66
Major and medium irrigation	22.0	24.9	31.0	42.5
Minor irrigation	29.5	31.3	39.0	47.5
TOTAL	51.5	56.2	70.0	90.0

Source: ITFYP, p. 382.

Industries and mining.--This sector together with the transportation and communications segment of the economy accounted for about one-half of the estimated outlay in the public sector for the second plan. This plan period was to mark a major effort in India's big drive toward industrialization. A total of Rs. 890 crores was allocated to this sector with Rs. 617 crores going for large and medium industry, Rs. 73 crores for mineral development and Rs. 200 crores for village and small industry. The mineral development portion of the plan was confined mainly to coal mining and facilities, and oil prosecting and the expansion of the activities of the Geographical Survey and Bureau of the Mines. The outlay on large and medium industry was primarily for the development of basic industries such as iron and steel, fertilizers, heavy engineering and heavy electrical equipment. An

additional Rs. 575 crores was allocated to large scale industry and mining by the private sector with major emphasis to be on iron and steel, chemicals, cement and refractories, consumer goods as well as machinery, automobiles and structural fabrication in the heavy and light engineering industries.

The government policy concerning the industrial sector was, as previously mentioned, spelled out in 1948. This policy was further amplified by the Industrial Policy Resolution of 1956. The resolution divided the country's industrial sector into three major schedules.[1] Schedule A included those industries in which new units of production would be set up only by the State but would also allow for existing non-national industries in this category to expand their capacities. In cases where the State would seek private enterprise cooperation, the operations of the undertaking would come under general control of the government.

Industries listed in Schedule B could be expected to see greater participation by the public sector in future new undertakings either with or without private cooperation. Private enterprise, however, was

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[1] Schedule A included arms and ammunition; atomic energy; iron and steel; heavy castings and forgings; heavy plant and machinery used by iron and steel, mining and machines tool industries; heavy electrical plants and large turbines; coal and lignite; mineral oils; mining of iron ore, manganese, chrome, gypsum, sulphur, gold and diamonds; mining and processing of copper, lead, zinc, tin, molybdenum and wolfram; minerals listed in Schedule to the Atomic Energy Order, 1953; aircraft and air transport; railway transport and shipbuilding; telephones and telephone cables; telegraph and wireless apparatus; generation and distribution of electricity. Schedule B included all other minerals except "minor minerals"; aluminum and other non-ferrous metals not included in Schedule A; machine tools and ferro-alloys and tool steels; basic and intermediate products required for production of drugs, dyestuffs and plastics; antibiotics and other essential drugs; fertilizers; synthetic rubber; coal carbonization; chemical pulp; road and sea transport.

not precluded from participating in the development of these industries. Schedule C included all the remaining industries whose development would be brought about by the private sector.

Application of the resolution was especially prevalent in the coal industry where the private sector was forbidden to expand its production beyond its existing workings and immediately contiguous areas. Of the twenty-two million tons increase targeted, the public sector was to provide twelve million tons and the private sector ten million tons. Subsequent events revealed the failure of the public sector to meet its goal and led to a relaxation of strict enforcement of the resolution for the third plan. A representative selection of industrial capacity and production targets as well as the actual achievements over the second plan period are found in Table 16.

The overall fixed investment for both public and private projects in the organized industries amounted to Rs. 1,620 crores. The public sector accounted for Rs. 770 crores as against an original allocation of Rs. 560 crores and the private sector allocated Rs. 850 crores as opposed to an original estimate of Rs. 685 crores. Despite the thirty per cent increase over the original estimates, the final achievement of physical targets was only on the order of eighty-five to ninety per cent.

The actual cost of many of the projects was considerably higher than originally estimated. The three new steel mills and ancillaries at Bhilai, Rourkela and Durgapur as an example were to cost some Rs. 425 crores but had to be revised upward to Rs. 559 crores. The actual outlay amounted to Rs. 620 crores and was due primarily to increases in

TABLE 16--Continued

Industry	Unit	Production: Actual 1955-56	Production: Target 1960-61	Production: Actual 1960-61	Capacity: Actual 1955-56	Capacity: Target 1960-61	Capacity: Actual 1960-61
Electric transformers 33K.V. and below	million KVA	.63	1.3	1.2	N.A.	N.A.	2.2
A.C.S.R. Conductors	000 tons	8.7	15	22	15.4	15.4	28
Rayon Filament	million lbs.	16	55	47	28.1	55	52.3
Staple fiber	million lbs.	14	25	47.8	12	25	48
Cotton cloth (mill made)	million yds.	5,102	N.A.	5,127	N.A.	N.A.	5,300
Sugar[e]	million tons	1.86	2.3	3.0	N.A.	N.A.	2.25

Source: ISFYP, p. 59, and ISFYP Draft Outline, p. 117, IIFYP, pp. 502-508.

[a]Goal revised upward to 400 units.

[b]Total includes commercial vehicles, jeeps and station wagons as well as passenger cars which totaled 20,000 units. N.A. = Not Available.

[c]Revised downward to 10-11 million tons in May, 1958.

[d]Excludes decentralized sector

[e]Relates to crop year.

the quantities of work and escalation of the projects. Similar situations occurred in the private sector and the lack of experience in project evaluation hopefully will be overcome by some of the new consultant organizations that are being formed in the country for this purpose.

As Table 16 indicates, the overall experience has been relatively satisfactory with some important shortfalls included. The index of industrial production (1950-51 = 100) rose steadily from 138.6 in 1955-56 to 194.3 for 1960-61. In the public sector, even though the three new steel mills were finally put into place, the production from these mills amounted to only 0.6 million tons as opposed to a target of two million tons. In the important area of fertilizers the three new public plants at Nangal, Neiveli and Rourkela have been delayed from one to two years instead of being on full production by the end of the plan period. These as well as other shortfalls have had a retarding effect on the other sectors which depend on the industrial sector's products.

The industrial experience of the second plan has shown the difficulties that can arise when foreign exchange becomes short and planning is inadequate regarding the length of gestation periods of projects and their costs, and a shortage of managerial and technical personnel exists.

In the mining sector the major developments occurred in coal and iron ore mining. Giving due regard to the increases anticipated in the power, transport and industrial sectors, the production target for coal was placed at sixty million tons and iron ore at 12.5 million tons.

Of the twenty-two million tons increase expected in coal,

twelve million tons was to come from the public sector. About two million tons of production was anticipated from existing collieries and ten million tons from new mines in virgin areas or stated another way, the state collieries were to increase their total production from about 4.5 million tons to sixteen million tons. However, the output fell short by about nine million tons.[1] Total coal production stood at 54.6 million tons in 1960-61.

The difficulties experienced by the public sector in achieving its coal production target were many. Legislation had not been passed to allow the public sector to acquire the new coal sites and the necessary exploration had not been carried out to prove reserves. The sector did not have ready an organization that could move in and administer the additional activity which would be needed for the increased production. Foreign exchange also presented problems in the earlier years of the plan.

A very sharp increase in iron ore production occurred over the plan period. This development reflected the government's desire now to export the ore as well as the expected expansion that was to take place in steel production. The export expansion was primarily to take place with Japan and reached a level of two million tons in 1960-61. Agreements signed with Japan will raise this level to eight million tons in future years. Over the past decade the value of major mineral production has risen from Rs. 83 crores in 1950 to Rs. 159 crores in 1960 (Table 17).

Transport and communication.--This sector received about twenty-nine per cent of the total provision in the second plan reflecting the

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[1]The Economist, March 26, 1960, p. 1270.

TABLE 17

TRENDS IN VOLUME AND VALUE OF INDIAN MINERAL PRODUCTION
(value in million rupees and volume in 000 tons)

Mineral	1950 Volume	1950 Value	1955 Volume	1955 Value	1960[a] Volume	1960[a] Value
Coal	32,310	46.68	38,230	56.03	51,810[b]	103.95
Iron Ore	2,970	1.54	4,620	3.23	10,520	7.70
Manganese Ore	880	8.48	1,590	10.82	1,160	8.18
Limestone	2,920[c]	1.03[c]	7,370	3.0[illegible]	12,530	5.62
Chromite	17	.06	89	.27	99	.57
Ilmenite	213	.33	251	1.32	246	1.47
Bauxite	64	.06	90	.09	377	.42
Magnesite	53	.11	58	.13	194	.27
Gypsum	205	.14	620	.45	932	.63
Copper Ore	360	1.20	333	2.58	441	2.37
Lead Concentrates	2[c]	N.A.	3	.08	6	.22
Zinc Concentrates	2[c]	.07[c]	5	.17	10	.25
TOTAL VALUE	-	63.41	-	94.36	-	159.02

Source: ITFYP, p. 515.

[a]Provisional figures.

[b]Includes lignite from Jammu and Kashmir, 4047 tons in 1960.

[c]Calendar year 1951. N.A. = not available.

expected rising demands that would be made on the system during the second plan. Of the total Rs. 1,385 crores, some Rs. 900 crores would go into railway development, Rs. 263 crores for road and road transport, Rs. 96 crores for ports and harbors, shipping and inland water transport, Rs. 50 crores for civil air transport and other transport and Rs. 76 crores for communications and broadcasting.

The volume of goods traffic was expected to increase [illegible] per cent rising from 120 million tons in 1955-56 to about [illegible] tons in 1960-61. While recognizing that the allocation [illegible]

fall short of requirements, the railways addressed themselves to the task by emphasizing the construction of new lines, by renewing the obsolete track, by dieselization and electrification of more track and by adding rolling stock. The program called for doubling of 1,600 miles of existing track, converting 265 miles of track from meter gauge to broad gauge, electrifying 800 miles of track, dieselizing 1,293 miles of track, renewing 8,000 miles of obsolete track and constructing 850 miles of new lines needed to service the new industrial projects. These programs were expected to require Rs. 425 crores of imports of which Rs. 137 crores would be for steel, Rs. [illegible] crores for locomotives and the rest for various rolling stock and wagons.

In terms of actual achievement about 800 miles of track were electrified, 820 miles of new lines were built and provision for renewing 8,000 miles of track was largely accomplished.[1] Foreign exchange expenditures amounted to Rs. 332 crores and total estimated expenditure on the railways amounted to Rs. 860.1 crores.

In terms of rolling stock the plan called for 2,258 locomotives, 107,247 wagons and 11,364 coaches of which 1,352 locomotives, 23,852 wagons and 6,477 coaches would be used for rehabilitation of overaged stock. Table 18 gives the actual rolling stock on line as of 1961.

Some 154 million tons of goods traffic was handled at end of plan period as opposed to the estimated target of 180 million tons. A major area of strain was in coal shipment from the Bihar-Bengal fields due to wagon shortage and changes in pattern of coal production.

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[1]Statistical results concerning doubling, conversion and dieselization of track were unavailable.

TABLE 18

ROLLING STOCK ON LINE IN INDIA AS OF
MARCH 31, 1951, 1956, AND 1961
(number of units)

Rolling Stock	1951	1956	1961
Locomotives	8,461	9,172	10,554
Coaches	20,502	23,155	28,171
Wagons (4 wheelers)	222,441	268,493	341,041

Source: ITFYP, p. 537.

The road development programs envisaged an increase in surface roads from the total 107,000 miles in 1955-56 to a total of 125,000 miles with national highways increasing from 12,900 miles to 13,800 miles over the same period. There was also a large but not targeted increase expected in unsurfaced roads.

Results from the road development programs saw surfaced roads totaling 144,000 miles well over plan target as well as the Nagpur Plan of 123,000 miles and unsurfaced roads reaching a total of well over 250,000 miles as compared to the Nagpur Plan of 208,000 miles. National highways in 1960-61 totaled about 15,000 miles and also were over target.

During the plan period licensing policies were liberalized for road transport and taxes were simplified with a longer view to abolish double taxation now imposed on inter-State routes. Volume of goods traffic handled by road transport increased from 5.4 billion ton miles in 1955-56 to 10.6 billion ton miles in 1960-61 with further expansion being retarded primarily by a shortage of new vehicles. Foreign exchange

for this purpose was again in short supply. Of the Rs. 263 crores alloted some Rs. 241.8 crores were expended on roads and local road transport.

Following the completion of the construction of the port of Kandla to replace lost facilities of Karachi during the first plan, the main objective of the following plan was to modernize and rehabilitate the major ports and thus increase the handling capacity to a total of 32.5 million tons by 1960-61. The actual increase achieved was larger than that targeted with major port capacity rising to 37 million tons in 1960-61 up from 25 million tons in 1955-56. Ports and harbors expenditure totaled Rs. 33.4 crores[1] out of a provision of Rs. 45.3 crores.

Shipping development programs in the second plan called for shipping tonnage to increase from 480,000 GRT in 1955-56 to 900,000 GRT by the end of the plan period with targets for overseas and coastal shipping being 490,000 GRT and 410,000 GRT respectively. The programs entailed an expenditure of Rs. 52.7 crores out of an allocation of Rs. 47.4 crores and resulted in total shipping tonnage increasing to 905,000 GRT with coastal shipping totaling 292,000 GRT and overseas shipping going considerably over target for a total of 613,000 GRT. This was a welcome result as it enabled foreign exchange to be saved. India carried about eight to nine per cent of her overseas trade in 1960-61.

Civil air transport incurred expenditures of Rs. 49 crores going over the provided Rs. 43 crores. Four new airports were added to the existing eighty-four and four others were near completion by the end

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[1]Excludes expenditure met out of loans from IBRD and ports' own resources.

of the period. Air transport capacity increased from 52.75 million ton miles in 1953-54 to 117.4 million tons in 1959-60 with Air India International adding five Super-Constellations and three Boeing 707 jet aircraft to its fleet and Indian Airlines Corporation adding ten Viscounts.

Posts and telegraphs again assumed most of the expenditures incurred in the communications sector accounting for Rs. 50.6 crores out of the total Rs. 52.9 crores spent. The plan provided Rs. 67 crores for development. The number of telephones were to increase from 280,000 to 450,000 with number of post offices to rise 55,000 to 75,000 and the number of telegraph offices from 5,100 to 6,300.

Actual results at the end of the plan period revealed a total of 460,000 telephones, 77,000 post offices and 6,450 telegraph offices. Overseas communications services were expanded and internal broadcasting could now boast of at least one transmitting station in each language area of the country. Medium wave internal services were expanded to cover fifty-five per cent of the population and thirty-seven per cent of the total area of the nation. The total expenditure for the overall programs of transport and communication amounted to Rs. 1,299.8 crores out of a provided Rs. 1,385 crores.

Social services.--The Rs. 945 crores originally allocated to this sector represented close to twenty per cent of the total planned outlay and almost twice as much as allocated in the first plan. Actual expenditure incurred by each field is shown in Table 19.

Among the major targets of educational programs, there were to be in school attendance by 1960-61, sixty-three per cent of the six to

TABLE 19

ALLOCATION AND OUTLAY IN INDIAN SOCIAL SERVICES
(Rs. crores)

Item	Provision	Actual
Education	307	255.76
Health	274	216.34
Housing	120	80.33
Welfare of backward classes	91	79.41
Social welfare and labor and labor welfare	58	34.99
Rehabilitation	90	63.41
Schemes for educated unemployment	5	-
TOTAL	945	730.24

Source: ISFYP, p. 52, and IITFYP, p. 739.

eleven age group, 22.5 per cent of the eleven to fourteen age group and twelve per cent of the fourteen to seventeen age group. Actual results showed 61.1 per cent of the age six to eleven group, 22.8 per cent of the age eleven to fourteen group and 11.5 per cent of the age fourteen to seventeen group in attendance.

The number of teacher training institutions were to rise from 1,136 to 1,412 and the number of elementary-basic schools were to rise from 278,000 to 350,000. By 1960-61 there were 1,307 teacher training schools and 342,000 elementary basic schools in existence.

The quality of education slowly progressed as the proportion of trained teachers increased during the 1951-61 decade from fifty-nine to sixty-five per cent in primary schools, from fifty-three to sixty-five per cent in middle schools and from fifty-four to sixty-eight per cent in high schools. The number of universities rose from

twenty-seven in 1950-51 to forty-six in 1960-61. The number of colleges increased to a total of 1,050 up from 772 in 1955-56.

Another important development concerned the establishment of eleven rural institutes during the second plan whose purpose was to provide higher education for development of rural leadership and to stimulate participation of local population in community development programs. Enrollment reached 2,300 with an annual output of 500 graduates in various courses.

In health, the other major field of social services, programs in the plan envisaged medical institutions increasing from 10,000 in 1955-56 to 12,600 by the end of the plan and hospital beds rising from 125,000 to 155,000. The goal of 12,600 institutions was met and hospital beds increased to 185,600. The number of doctors was to increase to 82,500 and the number of nurses to 31,000. In 1960-61 there were but 70,000 doctors and 27,000 nurses. The annual admissions to medical colleges increased from 3,500 to 5,800 over the five year span and the number of medical colleges rose from forty-two to fifty-seven during the same time.

The malaria program was extended to the entire population during the second plan and the filaria program coverage increased from 15.1 million persons to 24.6 million persons. Maternity and child health centers also increased during the period rising from 1,856 to 4,500.

Pakistan's First Five Year Plan[1]

Going into its first plan period Pakistan had many of the same

[1]Much of the material presented in this section comes from the following sources: Government of Pakistan, Planning Commission, The

problems that faced India such as a rundown railway system, refugee resettlement problems, inadequate food supplies and membership in the ranks of the underdeveloped nations. In Pakistan's case, however, the problems were of longer duration since the nation did not formulate its first plan until 1955. Prior to this time there had been two main efforts at planning which included a Six Year Development Program in conjunction with the Columbo Plan and the Two Year Priority Program adopted in 1951. In neither of these cases, however, was there an attempt made to correlate the various projects with a general development plan in relation to the overall resources and requirements of the nation.

This late start may perhaps be best explained by a brief recollection of some of the major developments that occurred in the decade immediately following partition. At independence time, Pakistan was divided into two separate sections many hundreds of miles apart. Relations with neighboring India deteriorated and trade between the formerly complementary areas stopped. In the refugee exchange Pakistan gained many farm peasants and lost many educated and trained persons.

Industry was almost non-existent, and in the vital field of transportation and communications the situation was equally undesirable. Pakistan had only Karachi as a major port, no airline, almost no merchant fleet and not a single national radio station.[2] While both

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Second Five-Year Plan, 1960-65 (Karachi: Government of Pakistan, November, 1961), hereafter cited as PSFYP; J. R. Andrus and A. F. Mohammed, The Economy of Pakistan (Stanford: Stanford University press, 1958), hereafter cited as J. R. Andrus; A. Waterston, Planning in Pakistan (Baltimore: The Johns Hopkins Press, 1963), published for the international Bank for Reconstruction.

[2]Waterston, p. 9.

nations inherited the British-established Civil Service, only about one hundred experienced persons were left to man Pakistan's new Civil Service.

To compound the hardship further, the East and West sections of the country found it difficult to achieve a national outlook because of the many dissimilarities existing between them. The language, geography, agriculture and natural resource endowment were different in the two areas.

Perhaps the most divisive factor was the political strife that existed between the sections. It was not until 1956 that a Constitution was finally enacted. Even this did not bring stability and the coalition governments continued to fall.

Under such conditions economic development was to receive little serious attention. There were a succession of planning boards, economic councils and other agencies concerned with development, but these groups usually suffered from lack of qualified personnel and prestige and from excessive turnover at the higher levels. The creation of the first planowes much to the participation of foreign economic advisors, particularly the Harvard Advisory Group.

In the latter part of 1958 a military regime took over the country and a degree of political stability was achieved. In 1962 another Constitution was adopted and Pakistan now functions under a federal form of government. While the first plan began in April of 1955, it was not formally approved by the government until 1957. The coming of the new government in 1958 brought the first full support of the government to the economic development of the country.

The five aims of the first plan were to increase the national

income and standard of living; to increase health education, housing and social welfare services; to improve the balance of payments by export promotion and import substitution; to increase job opportunities; to increase rapidly the rate of development in East Pakistan. Wherever conflicts occurred between the national income and employment aims, the priority was to go to national income; and where they arose between balance of payments and national income, the preference was to go to the former.[1]

The plan originally called for a development outlay of Rs. 11.6 billion of which Rs. 3.6 billion would be in the private sector and Rs. 8 billion in the public sector. National income was to increase twenty per cent and industrial production was to rise by 75 per cent. The plan was revised downward two years later after it had been reviewed by a cross section of the country's educators and other interested persons. Two years of actual experience suggested that the increase in national income target was too high, and it was revised to a fifteen per cent increase. Outlay was now to amount to Rs. 10.8 billion with Rs. 3.3 billion and Rs. 7.5 billion[2] being assigned to the private and public sectors respectively. East Pakistan was to receive forty-three per cent of the public allocation, West Pakistan fifty per cent of the total and the Central Government seven per cent.

Actual achievements for the first plan registered an eleven per cent increase in national income and a per capita income increase

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[1] _Ibid._, p. 44.

[2] The actual allocation for the public sector totaled Rs. 9.3 billion but a twenty per cent shortfall was expected.

of three per cent as opposed to the targets of fifteen per cent and seven per cent respectively. The balance of payments unfortunately worsened rather than improved. Job creation achieved only fifty per cent of its anticipated target. Actual outlay for the plan period was close to expectations and amounted to Rs. 9,715 million with Rs. 6,315 million in the public sector and Rs. 3,400 million in the private sector.

Among the difficulties that faced Pakistan during the plan period were unfavorable harvests, terms of trade deterioration, lower than anticipated foreign exchange earnings, slow arrival of foreign aid and rising prices both internally and abroad. These problems, coupled with poor advance planning, shortage of technical personnel, materials and capital equipment and poor coordination between government agencies help explain why major shortfalls in physical targets occurred despite the ninety per cent fulfillment of the planned total financial target. (See Tables 20 and 21.)

<u>Agriculture and village aid</u>.--Improvements which were expected to take place in this sector included a nine per cent increase in food-grain production, a rise of thirty-three per cent in sugarcane and a fifteen per cent increase in both tea and jute output.

The Village Aid program in Pakistan is to some degree a counterpart to India's community development scheme. Pakistan seeks by this method and the later developed Basic Democracies institutions to uplift village life, to promote rural leadership and better economic conditions in the villages by increasing agricultural production and small village industries on a self-help and mutual help basis.

TABLE 20

PUBLIC ALLOCATIONS AND OUTLAY UNDER PAKISTAN'S FIRST FIVE YEAR PLAN
(million rupees)

Department	Allocation[a]	Per cent of Total	Actual Outlay			
			E. Pak.	W. Pak.	Cent. Gov't.	Total
Agriculture and village aid	1,129	13.9%	220	350	280	850
Water and Power	2,601	32.0	350	1,060	360	1,770
Industry, Fuel and Minerals	930	10.6	20	20	770	810
Transport and Communication	1,642	20.2	150	170	1,130	1,450
Housing and Settlements	771	9.5	130	160	450	740
Education and Training	581	7.1	71	82	82	235
Health	287	3.5	39	39	7	85
Manpower and Social Service	49	.6	3	3	4	10

Source: Andrus, pp. 493 and 494; PSFYP, p. 408.

[a]As this writer encountered considerable difficulty in obtaining detailed financial information concerning Pakistan's first plan, use was made of the data that was available. The allocation figures cited represent the first plan provisions prior to revision at which time the total was reduced to Rs. 7,500 million.

[b]Total actual outlay differs from the previously mentioned Rs. 6,315 million due to adjustment made to fit the definition of development expenditure used in the Second Plan. Revised totals are used whenever available in the text of the chapter.

Each development unit was to encompass an area covering between 150-200 villages having a population of about 100,000. Some 5,000 village workers were to be trained, with each of them having a responsibility for five to seven villages. The village workers were placed in groups of fifteen and assigned a supervisor who in turn was respon- to the development officer who headed the development unit. The ove

TABLE 21

SOURCES AND USES OF NATIONAL RESOURCES UNDER PAKISTAN'S FIRST FIVE YEAR PLAN
(million rupees)

Item	1955-1956	1956-1957	1957-1958	1958-1959	1959-1960	Total Period
Sources:						
Gross National Product	18,200	22,630	22,200	24,500	25,430	112,960
Inflow of Foreign Resources, Aid, Loans, Investment	525	515	577	710	1,125	3,452
Foodgrain and other Aid (US PL 480)	145	430	358	315	370	1,618
Foreign Exchange Reserves[a]	-340	90	300	50	-270	-170
Total Resources	18,530	23,665	23,435	25,575	26,655	117,860
Uses:						
Investment[b]						
Public	770	920	1,210	1,370	1,680	5,950
Private	900	930	1,000	1,000	1,000	4,830
Consumption						
Public	2,000	2,250	2,700	2,550	2,500	12,000
Private[c]	14,860	19,565	18,525	20,655	21,475	95,080
Total Uses	18,530	23,665	23,435	25,575	26,655	117,860

Sources: <u>PSFYP</u>, p. 26.

[a]Minus sign indicates that reserves were built up, thus reducing the availability of resources, and vice versa. Figures for 1959-60 are till March, 1960.

[b]Estimates have been adjusted to the definition of development expenditure used in Second Plan.

[c]Obtained as a residual. It includes non-Plan investment for no estimate is available.

program during the plan period expected to cover about seventeen mi[llion] people in 26,000 villages or about one-fourth of the rural populati[on] through the establishment of 172 areas.

data in Table 22 reveals unsuccessful performance in achieving targets in almost every major crop category. Total foodgrain production stagnated as opposed to the target increase of nine per cent making necessary the expenditure of Rs. 700 million in foreign exchange earnings for foodgrains as compared to the Rs. 410 million expected in the plan. Foreign exchange expenditures on all food imports averaged Rs. 470 million a year during the first plan period. Shortfalls in achieving targets in water development, land reforms, as well as flood damage also contributed to the unfavorable results recorded for agriculture. A higher than anticipated rate of population growth also occurred.

Included in the various measures proposed to increase agricultural production in the first plan were targets for the greater use of fertilizers, chemical fertilizers and improved seeds as well as increased plant protection and foodgrain storage capacity. Consumption of chemical fertilizers fell short of the target of 240,000 tons for 1959-60 as only about 160,000 tons of ammonium sulphate equivalent were shipped. Improved seed programs were to encompass seventeen per cent of the area under major food crops in West Pakistan and six per cent in East Pakistan. The respective results showed seven per cent for the former and one per cent for the latter. Purchase of land for government seed farms proved difficult and expensive.

Prior to the plan, annual loss of major food crops due to disease and pests ran about Rs. 93 million. The number of acres treated with chemicals increased from 200,000 acres in 1954-55 to 1.3 million acres in 1959-60. The chemical treatment of seeds was also greatly expanded.

TABLE 22

AGRICULTURAL PRODUCTION TARGETS AND ACHIEVEMENTS DURING PAKISTAN'S FIRST PLAN

Crops	Period[a]	1959-60	Over Base	Actual Production 1955-56	1956-57	1957-58	1958-59	Average 4 Years	% Increase Over Base
Cleaned rice (000 tons)	8,320	9,000	8	7,212	9,016	8,487	7,890	8,152	-2
Wheat (000 tons)	3,435	8,839	12	3,339	3,606	3,544	3,865	3,588	4
Maize (000 tons)	395	465	15	453	449	442	466	452	4
Other foodgrains	725	781	8	732	747	623	653	689	-5
TOTAL	12,878	14,076	9	11,736	13,818	13,096	12,874	12,881	Neg.
Sugarcane (000 tons)	10,600	14,110	33	12,059	12,640	14,880	15,420	13,750	30
Fruits, Vegetables	4,200	4,977	19	N.A.	N.A.	N.A.	N.A.	N.A.	-
Oilseeds, Cottonseeds (000 tons)	890	1,017	15	974	973	948	N.A.	965	8
Cotton (000 bales)	1,630	1,967	21	1,693	1,725	1,666	1,547	1,658	2
Jute (000 bales)	5,565	6,400	15	5,592	5,514	6,200	6,000	5,826	5
Tea (million lbs.)	52.8	60.7	15	52.5	54.6	44.5	53.5	51.3	-3
Tobacco (million tons)	260	300	16	197	192	214	224	207	-20

Source: PSFYP, p. 132.

[a]Base periods are as follows: Average production, 1948-49 to 1954-55 for foodgrains, sugarcane, oilseed; average of data available between 1948-49 and 1953-54 for fruits and vegetables; estimate for 1954-55 for cotton and tobacco; estimate for 1950-51 to 1954-55 excepting 1953-54 for jute; average production for 1951-52 to 1954-55 for tea.

Foodgrain storage, needed for pest protection as well as a means to tide over the nation in times of poor harvest and increased speculation was estimated to be about two millions of capacity. The end of the plan showed a capacity of only 1.06 million tons.

Recommendations made in 1955 calling for widespread detailed soil surveys which would provide information on what fertilizers to use on different crops under different growing conditions have received slow implementation. Little was done with the proposed experiments to determine the value of using gypsum to improve farm land.

The animal husbandry budget amounted to Rs. 93.1 million with the major allocations going to breeding, Rs. 31.8 million; education and research, Rs. 26.2 million; disease control, Rs. 13.1 million and dairying, Rs. 5.3 million. Shortfalls occurred throughout the programs. Five cattle breeding farms were set up and seven poultry multiplication farms were established as against the target of fifteen new poultry farms.

The plan provided for fifty-two new animal hospitals and dispensaries and twenty mobile dispensaries to concentrate mainly in rinderpest, anthrax and black quarter. The program produced twenty-six new facilities and sixteen mobile units.

Dairying progress was slow. Aside from the difficulties encountered in raising production, the lack of adequate transportation from surplus rural areas to the consuming urban areas impedes the program.

Research facilities were expanded at Comilla, Peshawar, Lahore and Mymensingh. A section to study livestock economics was established in West Pakistan and plans for a similar section in East Pakistan were

formed. Educational facilities at the two existing animal husbandry colleges located at Lahore and Dacca were also expanded, thus allowing admissions to increase considerably.

About 3.7 per cent of Pakistan's total land area is in forests. The nation is a timber importer and, like India, has a fuel wood shortage, which results in the burning of dung which could be applied to increasing agricultural production. At present, policy toward forestry appears to center on increasing extraction in East Pakistan and afforestation in West Pakistan.

Timber production was to increase twenty-six per cent in the first plan but only achieved a thirteen per cent rise. The Chittagong Hill Tracts were to yield about 40,000 tons of timber annually but only reached a level of 10,000 tons. Afforestation in West Pakistan was concentrated on areas that had over thirty inches of annual rainfall and areas not suitable for crops. Some 190,000 acres were afforested and 170,000 more acres were rehabilitated during the first three years of the plan. In the forestry departments, as seems to be the case in most Pakistani departments, there is a shortage of technicians.

Soil conservation requirements appear to be highest in West Pakistan where about twenty-three million acres are irrigated but about 160 million acres are exposed to wind and water erosion. Only eight of the planned fifteen anti-erosion demonstration areas were set up.

Fishery development programs received an allocation of Rs. 28.1 million. Pakistan and India both have considerable potential in this field but neither has realized even a reasonable fraction of it. Pakistan's catch was to increase by thirty per cent over the plan period

but only accomplished a thirteen per cent increase. Total catch amounted to only 290,000 tons in 1959-60. Foreign aid provided 163 marine diesel engines for partial conversion of the fishing fleet in West Pakistan. East Pakistan could not convert as readily and required new boats of which only two were constructed.

Water and power development.--This sector was allocated thirty-two per cent of the total provisions of the five year plan. The programs were designed to increase the area under irrigation and to bring about a substantial increase in the nation's electrical generation capacity. This was to be accomplished through the construction of multi-purpose projects, area improvement through drainage, flood control and reclamation schemes.

At the beginning of the plan, the country had 22.7 million acres under irrigation and by the end of the plan period the total reached twenty-four million acres. Some 2.57 million acres also were improved through measures of flood control and drainage (Table 23).

TABLE 23

IRRIGATION TARGETS AND ACHIEVEMENTS
UNDER PAKISTAN'S FIRST PLAN
(000 acres)

Region	Target		Actual	
	New	Improved	New	Improved
East Pakistan	100	1,819	58	562
West Pakistan				
Indus Basin & Frontier Regions	1,453	3,544	1,000	1,998
Coastal & Desert Streams Reg.	118	48	24	10
TOTAL	1,671	5,411	1,082	2,570

Source: PSFYP, p. 197.

Progress was not as satisfactory in reclamation of saline soils and waterlogged areas. As opposed to the targets of reclaiming 350,000 acres and lowering the water table in 150,000 acres only 170,000 acres were partially reclaimed and very little done in waterlogged areas. Of the 1,500 tubewells that were to be sunk only 1,000 were completed and due to lack of electricity were not put into operation.

At the beginning of the plan the total generating capacity of the country stood at 342,000 kilowatts. It was anticipated that, with the addition of 737,900 kilowatts by public utilities and 111,000 kilowatts by industrial establishments, the total installed capacity would reach 1.19 million kilowatts. Actual results revealed 906,000 kilowatts installed (Table 24). The public utilities total is divided in thousands of kilowatts as follows: hydro, 250.7; steam, 312.8; diesel, 90.0.

TABLE 24

ELECTRIC POWER CAPACITY IN PAKISTAN'S FIRST PLAN
(000 kilowatts)

Region	1955 Total Installed		1960 Target Addition		1960 Total Installed	
	Public	Indus.	Public	Indus.	Public	Indus.
East Pakistan	32.2	42.0	190.5	25.0	103.2	72.0
West Pakistan						
Indus Basin and Frontier Regions	132.8	63.0	547.4	86.0	490.3	122.0
Coastal and Desert Streams Region	35.4	37.0			60.0	58.0
TOTAL	200.4	142.0	737.9	110.0	653.5	252.0

Source: Pakistan Chief Engineering Advisory Office as cited in PSFYP, p. 198.

The overall progress in this sector was mixed. Of the total revised allocation of Rs. 2,697 million only Rs. 1,770 million was expended with the major shortfall occurring in East Pakistan where only Rs. 350 million was spent out of a provision of Rs. 928 million. In many cases real costs and benefits were not soundly appraised and coordination was lacking even between different phases of the same project. The creation of a Water and Power Development Authority in each Province late in the plan period is expected to help overcome in the future many of the difficulties encountered during the plan period.

Industry, fuels and minerals.--Like India, Pakistan has a mixed economy and, in the industrial sphere, the public sector is prominent. However, important differences exist between the two nations. Pakistan has reiterated its policy toward private enterprise by the statement,

> It is a basic assumption of the Plan that for the implementation of the industrial development programme, reliance will be placed primarily on private enterprise. This assumption has been made not so much to reduce the burden on public finance as in recognition of the fact that private enterprise has a key role to play in the economic development of the country.[1]

The government has not reserved industries for the public sector and will promote all industries and participate directly in those where private capital is lagging. The Pakistan Industrial Development Corporation will take on these projects either entirely or in cooperation with private investors and will at an appropriate future time divest itself from these activities after they are established.

The revised plan called for a total allocation of Rs. 3,215 million for industrial development of which Rs. 1,480 million would be in the public sector and Rs. 1,735 million in the private sector. Actual

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[1]PSFYP, p. 225.

investment amounted to Rs. 750 million in the public sector and Rs. 1,100 million by private investors. Prime cause for the shortfalls was the shortage of foreign exchange that required restriction on importation of necessary raw materials, replacement equipment and accessories. Despite this difficulty, production in large and medium scale industries increased by eighty per cent in 1959 over 1954 as opposed to the target of 65.5 per cent. Small scale and cottage industries, on the other hand, lagged with very little being done.

Textile manufacturing is the largest of the developed industries, with cotton and jute as its major components. Expansion of the cotton textile industry, largely by private enterprise, enabled the country to shift from a net importer in this industry in 1952 to a net exporter in 1959-60. Aside from meeting domestic demand, this industry earned about Rs. 200 million in foreign exchange in 1959-60 and saved perhaps Rs. 900 million in imports in 1960.

Starting from a base capacity of 1.46 million spindles and 20,700 looms, the plan anticipated totals to increase to 2.2 million spindles and 38,700 looms. Foreign exchange shortages interfered with the expansion but due to foreign orders placed under deferred payments agreements prior to 1955 the capacity was increased to provide a total of 1.95 million spindles and 29,000 looms. In addition to the power looms there are about 500,000 handlooms in existence. In terms of production the cotton textile industry increased its yarn production from 190 million pounds in 1954 to 380 million pounds in 1959 with its total yarn and cloth production being valued at about Rs. 1,000 million in 1959. It employed about 150,000 workers or about one-third of the total employed

in large-scale industry.

Jute manufacturing was second to cotton in terms of employment and contribution to national income, but first in terms of export earnings. It accounted for over one-half of the total foreign exchange earned in 1958-59. The planned programs were to raise the capacity from 6,500 to 12,000 jute looms. Actual achievement recorded only three additional mills being built with a combined capacity of 1,500 looms increasing the overall total to 8,040 looms in fourteen jute mills. Production increased from 53,000 tons in 1954 to 250,000 tons in 1959-60 under the impetus of the export bonus scheme inaugurated after the new regime came into power. Expansion was limited by high production costs, labor problems, low profits and a fluctuating foreign demand for jute products. Nevertheless, progress in this industry has been very large since partition, for at that time no jute mills were in existence.

Other large-scale industry developments revealed that Pakistan achieved the installed capacity for self-sufficiency in paper, bicycle tires and tubes, and largely met its target in cement production which went up from 673,000 tons in 1954 to 1.28 million tons in 1960. The two fertilizer plants in operation at the end of the plan period had a capacity of 68,000 tons and an oil refinery is being set up at Karachi that will refine 1.5 million tons of imported crude and thus save Rs. 30 million in foreign exchange. The absence of heavier industries, especially in the metals field, reflects the scarcity of natural resources upon which such industries are based.

In the fuel and mineral fields most of the plan's progress were aimed at attaining broader knowledge of the geology of the country,

Pakistan at present is an importer of fuels such as petroleum products, coal and coke. In 1959 these imports amounted to Rs. 303 million. The best hope of meeting future increased demand appears to lie in the development of mineral fuel deposits of which only natural gas and peat occur in any appreciable quantity at present.

Transport and communications.--At partition Pakistan received sixteen per cent of the total railway track mileage and ten per cent of the total surfaced road of undivided India, both of which were in poor condition. North-Western Railway in West Pakistan has 5,246 miles of track while the East Bengal is but 1,620 miles in length. Aside from a World Bank loan of U.S. $27.2 million in 1952 that provided for the purchase of much needed rolling stock and some equipment received under the Columbo Plan, no systematic development program was attempted before 1955. The first plan provided this sector Rs. 1,383.5 million, excluding shipping, with actual expenditures reaching about Rs. 1,850 million.

The transportation patterns of the two sections of Pakistan are quite different. East Pakistan, reflecting the geography of the area, depends primarily on its inland waterways which handle about seventy-five per cent of internal traffic. Here the main problem is silting of the waterways and a lack of navigational facilities. In West Pakistan the transport system is composed mainly of railways and a growing road transport sector.

The railways, which were in dire need of rehabilitation, received the bulk of the provisions. Reveval of track, new rolling stock and stations as well as modernization of workshops, plant and machinery were

to cost Rs. 683 million. The total railway development programs amounted to Rs. 796 million. The major components of the rolling stock and track renewal programs are depicted in Table 26.

TABLE 26

RAILWAY ROLLING STOCK AND TRACK RENEWAL TARGETS AND RESULTS UNDER PAKISTAN'S FIRST FIVE YEAR PLAN

Item	For Use in 1955	Overaged Portion	Plan Target	Actual	Outlay Target	Outlay Result
Rolling Stock:					Rs. 312 million	Rs. 435 million
Steam Locomotives	1,223	257	-	-		
Diesel Electric Locomotives	92	-	98	135		
Wagons	44,634	8,495	7,253	7,253		
Passenger Coaches	2,700	835	444	604		
Other Coach Vehicles	1,500	-	-	-		
Diesel Cars with Trailers	-	-	24	24		
Track Renewal:					Rs. 248 million	Rs. 211 million
Miles of Rails			1,463	955		
Miles of Sleeper Renewals			2,430	1,414		

Source: PSFYP, pp. 281, 284, 285.

Other railway progress during the first plan included an expenditure of Rs. 25 million for refurbishing existing plant facilities and replacement of obsolete machinery and equipment; expanding the Moghalpura workshops in West Pakistan to a manufacturing capacity of 1,000 broad-gauge wagons per year and assembly of 100 broad-gauge passenger coaches, capacity installation of Pahartali workshops in East Pakistan to produce 250 wagons a year; strengthening and construction of a number

of bridges. With the exception of a shortage of engineers and supervisory personnel, the railways were amply supplied with technical persons due to the large number who opted to stay in Pakistan at the time of partition.

Traffic on the two railways has increased during the plan period with 4.5 per cent increase per year in passenger miles and 6.5 per cent increase per year in ton miles registered for West Pakistan. East Pakistan recorded a four per cent per year increase in passenger miles and an eighteen per cent per year increase in ton miles.

After partition work to expand Karachi port started immediately and by 1955 the port could handle over two million tons of incoming cargo. Anchorage at Chalna/Mangla on the Pusar River in East Pakistan was also established for ocean going vessels. The small Chittagong port in East Pakistan became very important after partition as the Calcutta port became Indian territory. About Rs. 88 million was expended by 1955 expanding Chittagong's capacity from one-half million tons to 2.5 million tons per year. It is through this facility that the important jute exports are shipped. Expansion of these three ports were the major aim of the first plan allocation of Rs. 163.5 million. Actual expenditures amounted to Rs. 183 million. Total traffic handled by Karachi reached over four million tons during the plan period and some 2.2 million tons were handled by Chittagong in 1957-58. The traffic through Chalna/Mangla Anchorage increased from 77,000 tons in 1950-51 to 811,000 tons in 1957-58.

Pakistan's merchant fleet is not large, amounting to some 180,000 dead-weight tons in 1955 with most of the ships being over thirty years

old. Over the plan period private investors added ten new cargo ships. The total fleet consisted of twenty-six ships, of which sixteen were less than twenty years old. The plan provided for a Merchant Navy Academy at Juldia Point in East Pakistan but work was not completed. Pakistan was apparently able to handle its own coastal shipping and finally joined the international trade routes during the plan.

Inland water transport programs in East Pakistan did not fare well during the plan period. The system,which was run by private enterprise, had 800 self-propelled vessels, 650 dumb craft, 110,000 country cargo boats, 200,000 country passenger boats. There are 2,800 miles of navigable rivers which increase to 4,000 miles during the monsoon season.

To utilize this natural resource efficiently requires navigational aids, dredged channels and adequate terminal facilities for passengers and cargoes. It is to this task that the Rs. 83 million provision was addressed. Only Rs. 15 million was expended because of the lack of pertinent data concerning traffic movement in terms of passengers and tonnage as well as the lack of coordination between responsible agencies. The Inland Water Transport Authority did not come into existence until the time when the new regime came into power.

Road development schemes provided for the construction of 1,825 miles of new roads and improvement of 2,050 old roads costing Rs. 360 million. In West Pakistan of the 1,025 miles of new roads to be added about 1,150 miles were built and of the 1,700 miles of old roads to be renewed some 1,400 miles were improved. In East Pakistan 665 miles of new roads were built as opposed to the target of 800 miles and some 1,560 miles of road are in various stages of progress.

The end of the plan period saw a total of 3,215 miles of road either built or improved at an expenditure of Rs. 406 million. Cause of East Pakistan's shortfall was reflected in the policy of beginning construction of works all over the Province with a view to spread the benefits widely. The result was the construction of a number of unrelated patches of roads having very little value to the transport system at the end of the plan period.

In the civil aviation field, Rs. 170 million was spent as against an allocation of Rs. 78 million. The emphasis was on training personnel of the Pakistan International Airlines (PIA), expanding airport facilities and procurement of air craft. The terminal building in Karachi was enlarged and the runways at Lahore and Dacca were strengthened. PIA added to Super-Constellations, two Convairs and five Viscounts to its fleet over the plan period. During 1955-60 the airline's freight tonnage increased from 1,096 to 4,469 tons and the number of passengers carried from 70,000 to 203,000.

Programs relating to posts, telegraphs and telephones entailed an expenditure of Rs. 254 million going over the target provision of Rs. 219 million. Progress in the number of post and telegraph offices as well as telephones are set out in Table 27.

At independence the country had only three medium-wave broadcasting stations at Lahore, Pashawar and Dacca. In 1955, the total stood at five with eight ancillary transmitters with a power of 170 kilowatts. Allocations for expansion amounted to Rs. 25 million of which Rs. 13 million were spent. The nation in 1960-61 had ten stations with nineteen medium and shortwave transmitters with a power of 204 kilowatts and broadcast in seventeen languages.

Overall broadcasting facilities were still meager as only ten per cent of the country's area was being served. Short-wave transmission between the two sections of the country was inadequate with Karachi being able to transmit to Dacca but unable to receive from East Pakistan.

TABLE 27

NUMBER OF POST OFFICES, TELEPHONES AND TELEGRAPH OFFICES IN PAKISTAN IN 1955 AND 1960

Item	1955	1960
Number of Post Offices	7,998	9,850
East Pakistan	3,490	4,150
West Pakistan	4,508	5,700
Number of Telephones	37,000	75,000
East Pakistan	5,800	12,500
West Pakistan	31,200	62,500
Number of Telegraph Offices	940	1,040
East Pakistan	360	400
West Pakistan	580	640

Source: PSFYP, p. 310.

Housing and settlement.--The plan provided Rs. 861 million to meet the nation's requirements in housing, water supply, drainage and sanitation and government offices and housing. Details of the results were not available except that most of the programs fell short of targets with the exception of government office construction.

> The policies proposed for the public sector were not observed, the programs were only incidentally followed, and the priorities were confused because of uncoordinated implementation by the several departments concerned with the programs.[1]

Private sector results were over target.

[1] PSFYP, p. 322.

Education and training.--In the field of education and training improvements were designed to overcome the qualitative shortcomings of the system and to expand its structure. About Rs. 400 million including recurring expenditures was spent on the programs as opposed to the provision of Rs. 580 million.

General conclusions were that the quality of education did not improve much. Primary school enrollment was below target although secondary enrollment improved. Teacher training rose at the secondary level but not at the primary level. Technical education output was below target levels. Sixty new colleges were established and enrollment in them and universities doubled.

Some 4,000 new primary schools were to be added to the existing 15,500 in West Pakistan and 6,000 of the existing 26,000 in East Pakistan were to be improved. Very little was done in East Pakistan and 2,400 new schools in West Pakistan were set up. The enrollment increased by only 440,000 children as against a target of one million students.

In secondary education 540 new schools opened and the enrollment increased by 230,000 as opposed to the plan's anticipated 515 new schools and 144,000 more students. However, the quality of the program did not improve and the anticipated diversification did not take place. About 80 per cent of the population was illiterate. About 42 per cent of the 6 to 11 age group and 12 per cent of the secondary education age group were attending school. The overall results of education development in the first plan are depicted in Table 28.

Health.--Health programs during the first plan stressed vaccination programs, physical facilities and increasing the number of medical personnel. Only about forty per cent of the planned provision was spent. The targets and results of the major components of the programs

TABLE 28

EDUCATIONAL DEVELOPMENT UNDER PAKISTAN'S FIRST PLAN

Item	1954-55	1959-60
Primary Education		
Schools	41,500	44,200
Enrollment	4,266,000	4,706,000
Secondary Education		
Schools	5,475	6,000
Enrollment	869,000	1,099,000
Teacher Training		
Primary Teacher Training Institutes	97	75
Teacher Training Colleges	21	23
Annual Output (primary teachers)	7,400	7,400
Annual Output (secondary teachers)	1,300	1,800
Engineering Education		
Technical Institutes	7	8
Annual output (diplomas)	191	500
Engineering Colleges	4	4
Annual output (degrees)	274	400
Medical Education		
Colleges	6	9
Annual output	350	450
Nurses' training centers	14	18
Annual output	152	200
Agricultural Education		
Agricultural Colleges	4	4
Annual output	120	150
Animal Husbandry College	2	2
Annual output	32	64
Forestry College	1	1
Annual output	2	3
Legal Education		
Colleges	8	14
Annual output	710	800
Non-professional Colleges		
Colleges	145	209
Enrollment	65,866	110,166
Universities		
Universities	6	6
Enrollment	3,900	7,400

Source: PSFYP, pp. 338, 339.

are enumerated in Table 29.

TABLE 29

SELECTED HEALTH PROGRAM TARGETS AND RESULTS UNDER PAKISTAN'S FIRST PLAN

Item	1955 Total	Target Total	Actual Total
Medical Colleges	6	8	9
Nurses Institutes	14	16	18
Nurses	1,414	2,400	2,000
Doctors	6,000	9,000	9,000
Hospital Beds	23,000	32,000	28,000
Maternity Centers	200	256	375

Sources: PSFYP, pp. 357 and 358.

While some progress was made, the overall medical and health services available in the country were still inadequate. Disease took a heavy toll of life annually. There was only one doctor for every 9,600 persons, one nurse for every 44,500 persons and one hospital bed for every 3,000 persons and very little else was done in the important area of family planning.

Having presented some of the broader aspects of the completed economic plans of the two nations, the study will now turn to a more detailed examination of the major sectors of agriculture, power and fuels, and minerals and industry. The planning experiences of each country will be drawn upon to ascertain the major problems of the sectors, especially the role played by natural resources in these sectors.

CHAPTER IV

AGRICULTURE

The main concern of this chapter, as in the remaining chapters, will be with the role and importance of natural resources to each sector, the significance of that sector to the respective country's economy and the manner in which the sectoral problems are handled. Since land is perhaps the single most important natural resource in the majority of densely populated underdeveloped countries, it seems appropriate to begin with it. In the words of C. L. White, "too many people forget that despite the fantastic contributions of science and technology everything man uses comes from the earth. The size of the arable area and size and quality of the natural resources are more or less definite and limited. Man must begin here!"[1]

Agreement does not exist as to the exact function that the agricultural sector plays in the economic development of heavily populated underdeveloped nations. Enough is not known, for instance, as to whether this sector alone is more influential than the others in initiating economic development and whether developments within it would serve to lead the other sectors. The demonstration effect concerning fertilizer use on the tea plantations of Assam, for example, does not appear to have operated effectively in India. In any case, there is wide recog-

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[1]C. L. White, "Geography and the World's Population," in S. Mudd (ed.), The Population Crisis and the Use of World Resources (Bloomington: Indiana University Press, 1964), p. 15.

nition that the contribution of the agricultural sector to the economic development of such countries as India and Pakistan is highly significant, deserves emphasis in development plans, and has at least as much repute as the other sectors at a time when the drive for self-sustained growth is begun.

In the past as countries have developed, the role of the agricultural sector to their economic growth has revealed a mixture of the following contributions:[1] rural labor was released to other sectors; an increased supply of food products and fibers was provided at a moderate cost; the sector provided agricultural exports to pay for needed imports of capital goods and technical services as well as savings to be invested in other sectors of the economy. In addition, past experience indicates that the relative contribution of the agricultural sector to national income and labor force employed declines, as also does the income elasticity of demand for food. During the maturing period science and technology are introduced into the agricultural sector as well as the other sectors to help alleviate the various problems facing a developing nation. These factors may help to explain the reason why natural resources tend to receive scant attention in discussions of economic development.

What then has been the experience of India and Pakistan in this regard since independence and what impact have natural resources had in the success or failure of their agricultural endeavors? Both India and Pakistan fill the traditional image held of an underdeveloped country.

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[1] D. G. Johnson, "The Role of Agriculture in Economic Development," in M. Clawson (ed.), Natural Resources and International Development (Baltimore: Johns Hopkins Press, 1964), p. 5.

The main economic activity has been agriculture which provides a major source of employment, national income and commodities for export. About seventy per cent of their respective populations derive their livelihoods directly or mainly from the land. In terms of gross domestic product, the share contributed by agriculture in India is about fifty per cent and slightly higher for Pakistan (Table 30).

TABLE 30

INDUSTRIAL ORIGIN OF GROSS DOMESTIC PRODUCT
INDIA AND PAKISTAN
(Percentage Distribution)

Country	Year[a]	Agriculture	Manufacturing Construction Electricity	Transport and Trade	All Others[b]
India	1948	49	16	18	17
	1953	51	16	16	17
	1958	50	16	16	18
	1959	48	17	16	18
Pakistan	1950	60	7	12	21
	1953	58	9	12	21
	1958	54	12	12	22
	1960	54	13	12	21

Source: United Nations, Statistical Yearbook, 1961 (New York: United Nations, 1961), p. 492, 493.

[a]Year beginning 1 April.

[b]Includes all services of general government for both countries. For Pakistan also includes indirect taxes on exports and construction sector percentages.

In comparing the role of the agricultural sectors of both nations to that of the previous experience of other nations as noted above, the results have been mixed. Agriculture has been the major source of

foreign exchange earnings for the two countries. These earnings have been invaluable to the pursuance of their economic plans. Savings from the agricultural sector have, however, been disappointing and the movement of rural labor to urban areas has in many cases served to turn what once was disguised unemployment and underemployment in the rural area into full-fledged unemployment in the cities. Neither country appears ready for any widespread release of rural labor into urban areas since unemployment in the cities also continues to be a problem. Even after the completion of two five year plans India's backlog of unemployment stood at over nine million workers.

The agricultural segments of both countries have not been able to provide enough food for their growing populations. East Pakistan suffered a famine in 1958.[1] The Indian famine in 1951[2] came only eight years after the disastrous Bengal famine that took about five million lives. Sporadic famines have continued to plague India up until the present day.

The food problem of both nations has been understated here when considered in light of the nutritional standards of developed countries and the standards developed for Pakistan and India by the Food and Agricultural Organization of the United Nations. The reference standard calls for daily intake of 2,300 calories per capita. The actual intake is below the standard and has deteriorated from pre-World War II levels (Table 31). Furthermore, the present diets not only are insufficient in the number of calories but are high in carbohydrate content and

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[1] J. E. Owen, "Plight of Pakistan," Contemporary Review (May, 1959), p. 292.

[2] "Death in Bihar," The Economist (May 26, 1951), p. 1239.

deficient in the quality and quantity of protein and fat, calcium and Vitamins A and B which milk products, meat, fish, eggs, vegetables and fruit can provide[1] (Table 32). The importance of an adequate diet is believed by many to be a vital condition for effective economic development and inadequate diets have been cited as one of the reasons for the apathetic response received from the general populace to various program proposals.

TABLE 31

CALORIE AND PROTEIN CONTENT OF THE AVERAGE DIET
IN INDIA AND PAKISTAN
(per capita per day)

Country	Period	Calories	Total Protein	Animal Protein
India	Pre W.W. II	2,560	73 (grams)	7 (grams)
	1949/50-50/51	1,630	44	5
	1954/55-56/57	1,840	49	6
	1960/61	1,900	53	6
Pakistan	Pre W.W. II	2,560	73	7
	1949/50-50/51	2,010	48	8
	1954/55-56/57	1,990	46	8
	1959/60	2,080	48	7

Source: Food and Agriculture Organization of the United Nations, The State of Food and Agriculture, 1962 (Rome: United Nations, 1962), p. 191.

Many reasons have been cited as to why the agricultural sectors of Indian and Pakistan have not been able to meet their needs, but when reduced to basic essentials their experiences point up the problems that arise when the shortage of a basic natural resource occurs. In this case it is land.

[1]Food and Agriculture Organization of the United Nations, Report of the FAO/UNICEF Regional School Feeding Seminar for Asia and the Far East (Tokyo: United Nations, November, 1958), p. 3.

TABLE 32

DISTRIBUTION OF PER CAPITA CALORIC INTAKE BY FOOD GROUPS, INDIA AND PAKISTAN, 1958

Item	India (kg)	Per cent of Calories	Pakistan (kg)	Per cent of Calories
Grain Products	138.3	65.1	150.1	73.0
Sugar	12.7	6.3	18.6	8.9
Roots & Tubers	30.4	2.9	5.6	0.7
Pulses	23.1	11.0	12.8	5.9
Fruits, Nuts & Vegetables	66.3	4.0	132.6	5.9
Meat	1.4	0.2	6.7	1.2
Fish	6.1	0.5	8.4	0.7
Fats, Oils	5.0	6.3	1.7	2.2
Whole Milk	32.8	3.7	11.8	1.5
Eggs	0.2	-	.3	-
Total Calories per Day		2,050		2,030

Source: United States Department of Agriculture, An Economic Analysis of Far Eastern Agriculture (Washington: U.S. Government Printing Office, November, 1961), pp. 43, 46, hereafter cited as USDA, November 1961.

At this point in the history of India and Pakistan agricultural land, the key natural resource, is in limited supply. These countries no longer have the advantage of claiming empty cultivable lands within their borders, an advantage that exists for instance, in Brazil, Uruguay, and some African nations. Indian authors believe that "very little if any land can be reclaimed for further development,"[1] and what reclamation is possible elsewhere on the subcontinent is now very expensive.

The most obvious answer to the dilemma, from an outsider's point of view, is to suggest the introduction of means by which to raise

[1] J. M. May, The Ecology of Malnutrition in the Far East and Near East (New York: Hafner Publishing Company, Inc., 1961), p. 205.

the productivity of the available agricultural land. While the solution may appear reasonable and simple the means necessary to accomplish it are considerably more complex. Implied in the solution are the upgrading of the inputs to agriculture, that is, the farmer, his bullock and his implements. The choice is to replace or increase the efficiency of them all. New technology has to be introduced to increase the quality of land and methods of utilizing it. Various incentives such as land reforms must be instituted to make proper use of the new factors introduced. Behind these factors are considerable expenditures of capital not only on the physical inputs but also on education of peasants and research necessary to implement the various programs.

Had not a scarcity of readily available land occurred the problems of national economic development in both countries may have been less stringent. The unemployment may have been less burdensome and the present agricultural productivity priorities less intense, thus allowing greater concentration on other sectors of the economy. It is possible, of course, that had more land been available and settled that the overall productivity conditions may have remained static as was the case of the United States from 1880 through 1930 when agriculture kept expanding into new land with little change in the ratio of output to input occurring.[1] However, in the case of India and Pakistan the capital inputs necessary to increase productivity under such conditions could conceivably have been less, depending on their character, than are presently needed.

This is not to be construed as an argument against the intro-

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[1] Johnson, p. 9.

duction of new technology which should serve as a substitute for natural resources, for it has been amply demonstrated that most of the presently developed nations utilized new technologies in their struggle for development. However, it should be noted that absence or shortage of a single or variety of natural resources does affect adversely the ability of a country to develop its economy especially in a climate of foreign exchange difficulty. Such difficulty is a situation that faces India and Pakistan as well as many underdeveloped nations.

The difficulties experienced by India and Pakistan in trying to substitute capital and new technologies for land demonstrate that this is not the panacea it may appear to be at first glance. There have, of course, been important advances in both countries' agricultural sectors due to new technologies but many of the basic problems remain and self-sufficiency in the matter of food production continues to remain a goal.

Understanding the concept of new science and technology and how it relates to a given nation is in itself a very complicated matter, but it becomes infinitely more complex when the attempt is made to implement it. First, there must be recognition of it and a desire to have it. It should be remembered that during India's successful First Five Year Plan (1951-1956), it appeared to her that her food problem was solved.[1]

Once the recognition and desire are realized the capital necessary to acquire it is needed. This is only the pre-condition for the problem of finding the right technology to fit the particular set of circumstances existing within the nation. In many cases the technologies

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[1]"Goodbye to Famine in India," The Economist (June 13, 1953), p. 729; "Notes from India," The Economist (August 28, 1954), p. 669.

conceived in developed nations may not fulfill the needs of an under-developed nation. While United States agriculture, for example, depends heavily on large mechanized equipment, this kind of technology has only limited value to subcontinent conditions at the present time.

Once the proper technology is found and acquired the sometimes painful process of implementing it begins and there is no guarantee that it will be widely accepted and used by the peasants. A fertilizer plant in Pakistan had to quit production for lack of demand. Some Indian farmers looked upon fertilizer as detrimental to the soil and would not use it. Other Indian farmers found the suggestion to turn over part of their land into fodder crops to give their bullock a better diet an interesting idea but continued their old ways. Other farmers refused to pay for irrigation water and preferred to trust to rainfall to water their crops.

The relationship between a natural resource, for example, land, and technological improvement is usually discussed in terms of capital or technology being substituted for the natural resource; as a result the impression is left that natural resources are not particularly important. It is the opinion of the writer that the importance of natural resources need not be diminished because of the introduction of new technology, and that they continue to play a part after each introduction.

Another view of technology can be that it serves to enhance the role of natural resources. Resources must exist for technology to play a role. Technology must have a base on which to operate and the base is natural resources. Technology and natural resources have a

reciprocal relationship, each fulfilling a requirement in order to achieve a desired result. The result is usually a substitution of capital or technology for natural resources. However, the substitution is usually partial because perfect substitution is unlikely. In many cases technological impact results in a different mix of existing natural resources being used to achieve a more efficient production. In fertilizers, for example, phosphate rock not hitherto used may be utilized through the addition of new technology and result in increased productivity on a fixed quantity of agricultural land. The same may apply where technology, through the form of multi-purpose irrigation and power projects, allows the two existing resources of land and water to be arranged in such a fashion as to allow the land to produce more through irrigation and multi-cropping, and at the same time, allowing part of the water to produce electricity instead of running uselessly into the sea. Consequently, while technology may be used as a substitute in one instance it may concurrently allow greater utilization of other natural resources lying in juxtaposition to the resource being partially substituted.

In returning to the subcontinent's agricultural dilemma, land can perhaps best be discussed in its relationship to the people who live upon it. The problem that has existed and continues to exist is the manner in which the relationship between the people and the subcontinent's available land is being resolved. Growing numbers of people, together with employment of technically primitive agricultural methods, have contributed to the creation of a land scarcity. In addition, advances in the health sector have brought about a decline in

TABLE 33

SELECTED POPULATION INDICATORS FOR INDIA AND PAKISTAN
1941, 1951, 1961, 1975

Country	Year	Total Population	Rural Population (mil)	Urban Population (mil)
India	1949	318.9	274.8	44.1
	1951	361.1	295.0	61.9
	1961	439.2	359.8	78.8
	1975	563.0	-	-
Pakistan	1941	70.1	67.4	2.7
	1951	75.8	68.2	7.6
	1961	93.8	81.5	12.3
	1975	128.0	-	-

Source: The 1951 and 1961 data are official Census figures from the respective countries; 1941 figures from Vakil, estimates from USDA, November 1961, p. 4.

Population forecasts are essential to any national economic development planning as the raising of per capita income is a basic target. Even a slight miscalculation can adversely affect the entire development plan. Both India and Pakistan suffered this misfortune by estimating their rates of population growth too low.

India's Second Five Year Plan (1956-1961) assumed a population growth rate of 1.25 per cent, expecting a total population of 408 million persons in 1960-61. The actual total population numbered over 438 million persons reflecting a rate of growth of about two per cent.[1] Pakistan's Second Five Year Plan (1960-1965) estimated the country's population growth rate to be between 1.6 and 1.8 per cent but the 1961

[1] ITFYP, p. 75.

Census showed the actual rate to be about 2.1 per cent.[1] For this and other reasons both nations have had to revise their plans.

The current estimated growth rate for each country is between 2.3 and 2.5 per cent, figures which must be treated as tentative.[2] Unofficial estimates, for instance, place the present population growth in West Pakistan at 2.5 per cent and 2.6 per cent for East Pakistan.[3]

It does not appear necessary to dwell on the desirability of accumulating better population growth statistics for this need is obvious to planners of the two nations. The experience, however, does point up the difficulty in planning and implementation where large numbers of people are involved. Measures in the form of National Sample Surveys already have been taken and consideration is being given to additional surveys and studies to evaluate the effects of economic development programs on the populations of both countries.

In examining the land side of the problem, the sizes involved here are also large. It must be emphasized that, while a dearth of land has been disadvantageous to both countries and has helped to create measures of urgency in their agricultural sectors, the very fact that sizeable land bases do exist within each of the nations provides future hope that their agricultural problems can be resolved. This assumes that the right technologies can be found and suitably applied to

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[1]Waterston, p. 106.

[2]Mr. P. Pant, Chief of the Perspective Planning Division of the India Palnning Commission estimates India's rate at 2.5 per cent in P. Pant, "The Development of India," Scientific American (September, 1963), p. 191; USDA (November, 1961), p. 4, estimates 2.3 per cent for both nations.

[3]Waterston, p. 106.

the land bases.

Table 34 presents the past and anticipated future land utilization in India for 720 million acres of her total area of 806 million acres. Table 35 indicates Pakistan's total land use pattern and is based on statistics available at the time her second plan was formulated. Pakistan's Second Five Year Plan recognized the deficiency of agricultural statistics for about 83 million acres, mostly in West Pakistan, and the areas continue to be classified as unreported.

TABLE 34

LAND UTILIZATION IN INDIA BY SELECTED YEARS
(millions of acres)

Area	1955-65	1960-61	1965-66
Total Reporting Area	720.	721	721
Forests	125.6	131	132
Land under Miscellaneous Tree Crops	13.9	14	15
Permanent Pastures and Grazing Land	28.4	32	32
Culturable Waste	54.8	47	40
Barren and Uncultivated Land and Land Put to Nonagricultural Use	118.7	114	114
Fallow Lands other than Current Fallows	30.9	28	26
Current Fallows	29.5	28	25.5
Net Area Sown	318.2	327	335
Area Sown More than Once	44.4	51.5	67
Gross Area Sown	362.6	378.5	402

Source: ITFYP, p. 184.

The manner in which India and Pakistan have attacked the population aspect of their problem which not only affects the agricultural sector but the entire economy, has been relatively ineffective. Faced with the fact that any nation with an annual rate of growth of two per

cent will double its present population in thirty-five years, neither India nor Pakistan have made much progress in controlling the size of their respective populations.

TABLE 35

PAKISTAN LAND USE PATTERN
(million acres)

Area	East Pakistan[a]	West Pakistan[b]	Total
Total Area	35.4	198.4	233.8
New Area Sown	21.0	31.0	52.0
Current Fallow	1.2	9.2	10.4
Total Cultivated Area	22.2	40.2	62.4
Forest Area	5.5[c]	32.2[d]	8.7
Not Available for Cultivation	5.0	51.0	56.0
Other Uncultivated Land (Excluding Current Fallow)	2.0	21.6	23.6
Area Not Reported	0.7	82.4	83.1

Source: Ministry of Food and Agriculture as cited in PSFYP, p. 136.

[a]Data for year 1954.

[b]Data for year 1957 except for Hyderabad and Jacobadad districts, Quetta and Kalat regions for which data are 1956.

[c]Includes area of 2.3 million acres classified as scrub forests.

[d]Only wooded area.

Migration as an alternative does not appear feasible. Indeed, India is being requested by other nations to take back Indian descendants who are presently settled within their borders. This remains an issue, for example, between India and Ceylon. There are in Ceylon about one million Tamil-speaking inhabitants of Indian descent who are not

recognized by India as Indians nor by Ceylon as Ceylonese.

From an economic standpoint migration is probably less desirable than family planning because the exporting country has had to bear the cost of sustaining and educating the migrants up until the time of their exit. Migration viewed in this manner may be analogous to the effect of a relatively high death rate.[1] Other effects may be the loss of potential leadership and disruption of family life. Migration will not solve the problem.

In asking the question, "How can a country raise the standard of living and reduce its death rate when it is unable to support the existing population even at a miserable level of living if at the same time the population continues to increase . . . by millions every year?", Mr. S. Chandrasekhar, noted Indian population expert concluded that planned parenthood was the answer.[2] The conclusion that family planning is the best available alternative to controlling population size is widely shared by most writers on the subject. What is needed is as wide a gap as possible between output and population growth rates to keep per capita levels from deteriorating and to meet the relatively higher consumption requirements.[3]

Fortunately the Hindu religion does not serve as a deterrent to such a policy although some religious beliefs do stress the necessity

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[1]"Study Conference on Economic Development in Underdeveloped Countries," Social and Economic Studies (September, 1958), p. 37.

[2]S. Chandrasekhar, "The Prospect for Planned Parenthood in India," Pacific Affairs (December, 1953), p. 321.

[3]W. Malenbaum, Prospects for Indian Development (Glencoe: The Free Press of Glencoe, Inc., 1962), p. 118.

of leaving male heirs as survivors to perform funeral rites after the death of the father. There is also no apparent absolute bar to birth control in the Muslim religion.

There seems little question that the two nations have to continue to be concerned with this matter if they are seriously interested in the economic growth of their countries. In the past India thought that the question could be answered through increased agricultural production but found later that more food and consumer goods were not the answer simply because of the number of consumers increasing even more rapidly.[1]

Both countries have recognized the need for such a policy and have taken steps to set up a formal program. Prime Minister Nehru publicly announced favoring birth control during the Bihar famine crisis of 1951 and said he would like to see a branch of the Family Planning Association in every town and village.[2] In 1956 India became the first country in history to adopt birth control as an official policy.

While the progress to date may appear disappointing, it is probably significant, especially in India, in view of the immensity of the problem. Short run material factors are usually more easily changed than social behavior which requires more patience and more time.

India has spent three cents per capita for birth control during its first two plan periods.[3] Pakistan's accomplishment during its first plan was summed up as, "The First Plan contained a small provision for

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[1]H. L. Geisert, Population Problems in the Development of India and South Central Asia (Washington: The George Washington University, 1961), p. 41.

[2]"Birth Control for India," The Economist (July 14, 1951), p. 97.

[3]Geisert, p. 42.

family planning, but practically nothing was done, except some pilot work by family planning associations."[1] The emphasis in both of the present plans has been increased, with India intending to expend Rs. 37 crores as opposed to Rs. 3.7 crores over its past two plans and Pakistan allocating about Rs. 3 crores to the present plan. India expects to set up some 5,000 rural clinics during the current plan bringing the total established up to 6,100. Since there are over 550,000 villages in India, progress will obviously be slow.

In view of the Indian government's contention that the main obstacles in expansion of the program are lack of trained personnel and organizational consideration, perhaps there is merit in an interim program whereby large numbers of government employees would be given basic instruction in family planning measures and would in turn spread the knowledge and hopefully speed up the indoctrination process. As these persons would be in contact with the villagers in their other capacities additional informational groundwork of the birth control programs might be effectively spread. The approach would supplement and perhaps reinforce the radio instruction now being broadcast to some of the villagers.

Because of the time lag factor of the problem, the longer that India and Pakistan wait to communicate and motivate the populace on the village level the longer it will be before any broad effects of this policy are felt. What progress has been made has largely occurred in the cities. Admittedly progress in the countryside is more difficult than in urban areas due to superstition, ignorance and poverty, but it is at the village

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[1]<u>PSFYP</u>, p. 360.

level that family planning must ultimately be focused. Even though India and Pakistan are in the unfortunate position of having "to run fast merely to stand still,"[1] any appreciable relief from population pressure through family limitation measures cannot be expected for a number of years.

The present emphasis necessarily has to be on the natural resource of land and serves to point up again its role in the struggle to improve both economies. In the present race between population and food production the brunt of the burden has to be carried by the agricultural sector.

As the land has been the chief natural resource asset in the past so will it continue to play its important part in the future with the addition of proper new technologies. What is needed is improvement of the existing land and the manner in which it is tilled. Adding more labor inputs will not meet the problem and neither can there be expected any widespread substitution of labor because the introduction of such technological improvements would only serve to defeat the purpose under the present employment picture.

What then have been the points of emphasis on agriculture in terms of outlays during the plan periods and what have been the results of the attempts to heighten the natural resources contribution to the sector's productivity? The experience of both countries will first be examined in terms of their first plan outlays on agricultural improvement as related to their existing population pressures on land. In addition, since the agricultural sector in each country constitutes the

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[1] *The New India*, p. 23.

largest sector and essentially forms the base for both economies, some of the components within the sector and their roles in economic development will also be surveyed.

India, which had a 1951 population density of about 300 per square mile, expended Rs. 844 crores on agriculture and community development as well as irrigation and power during the first plan period. This represented 43.9 per cent (Table 2) of the entire plan's expenditure and included only those rural education outlays that were designated under community development projects.

Pakistan, on the other hand, with a 1955 population density of about 255 per square mile,[1] spent Rs. 262 crores on agriculture and village aid as well as water and power development during her first plan period. This represented 44 per cent (Table 20) of the total planned outlays but did not include agricultural education expenditures.

This rough comparison suggests that India, which had a higher population pressure on its total land resources, expended the same proportion of its first plan on agricultural development as did Pakistan, which had a lesser overall pressure on its total land. It is recognized, however, that population density per square mile comparisons may mask variations between countries such as availability of cultivated land. Such is indeed the case. When a comparison is made using data on the availability of cultivated land, India fares better than Pakistan. In 1951 with a population of some 361 million and 325 million acres of cultivated land, India had 0.90 acres of cultivated land per person. Pakistan's cultivated land area (Table 35) at about the time its first

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[1]Excludes the disputed area of Jammu and Kashmir.

plan began stood at 62.4 million acres with a total population of 82.2 million persons. Pakistan had about 0.75 acres of cultivated land per person. In 1959 India's cultivated land amounted to 0.84 acres per capita with the figure expected to decline to 0.60 acres in 1975 while Pakistan's status in 1959 showed a per capita figure of 0.65 acres which is expected to decline to 0.44 acres over a similar time period.[1]

atios of cultivated land to rural population in both countries do not change the picture to any degree. The various comparisons reveal that India has the larger immediate task of the two nations in terms of feeding its people while Pakistan is faced with a more increasingly intensive pressure on its available cultivated land. Both must continue to strive harder if they are to overcome the vagaries of their monsoon environment and continue their economic development. The figures serve to reveal the pressing magnitude of each country's agricultural problem and the burden that each carries in trying to provide merely enough food much less providing the minimum dietary standards for its people.

The expenditures on agricultural improvement have been relatively sizeable but the improvements in agricultural output have not yet solved the basic problems. In reviewing India's food grain production progress over its first plan, it is remembered that the targeted fourteen per cent increase was achieved and twenty per cent increase was registered. However, the impact of technology on the agricultural sector during the first plan was only about one-half of what was originally expected. That is, only about four million tons of the increased production may be

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[1]USDA, November, 1961, pp. 10, 47.

attributed to technical advances in methods of production as opposed to the original target of 7.6 million tons. While the overall result in increased production was over original estimates, the main credit must be given to favorable weather. Rain (Figure 3) fell in adequate quantities at a desirable rate at the proper time and over most of the expectant areas of the country. The reasons for the shortfalls, which have been enumerated in the previous chapter, illustrate the difficulties encountered in implementing new technologies and point up the continued dependence of eighty per cent of India's crop area on the unreliable monsoons.

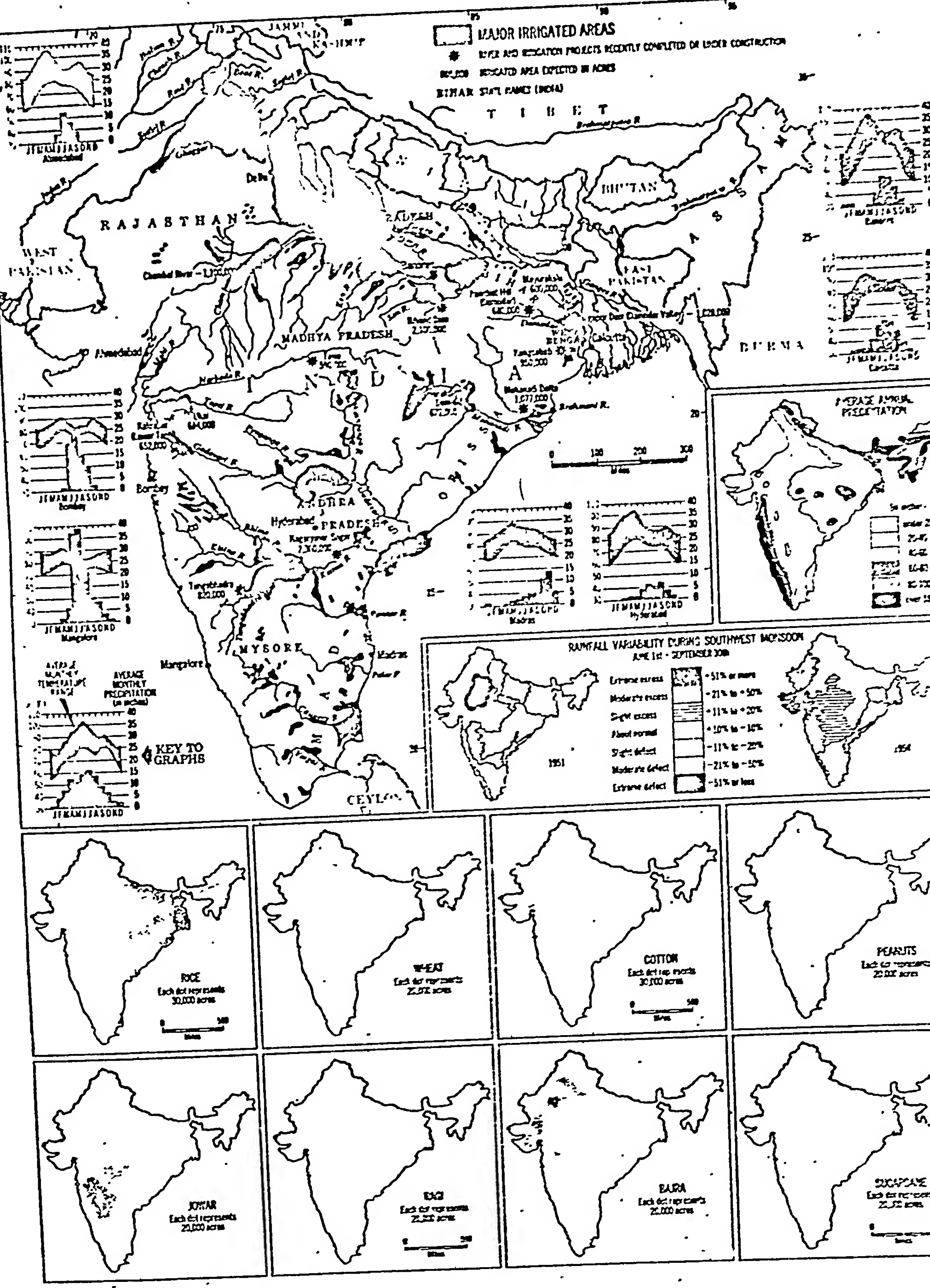
The results of the Indian second plan period reflected continued difficulties in implementation and dependence on the monsoons. In this case, two poor harvests, together with an unanticipated increase in the rate of population growth, resulted in not only under-target achievement but also inadequate supplies of foodgrains for the population.

Pakistan's record in food production improvement during its first plan revealed negligible results. Indeed, production stagnated and the average over the first four years of production only matched the base period from which the plan started (Table 22). A nine per cent increase was anticipated for the plan period. As in the case of India, faulty technological implementation accounted for some of the failure, especially in regard to water development, fertilizer use, improved seeds, pest and plant disease control. These problems and miscalculation of the rate of population growth made necessary food imports and resulted in a drain of foreign exchange.

Since Pakistan is in reality two separate entities, it is necessary

Fig. 3--Major irrigated areas.

Source: Alice Taylor and S. Reza Ahsan, "India's Agricultural Problems," Focus, XIV, 1 (September, 1963).



MAJOR IRRIGATED AREAS
BIHAR STATE NAMES (INDIA)
T I B E T
BHUTAN
RAJASTHAN
WEST PAKISTAN
EAST PAKISTAN
Delhi
Ahmedabad
MADHYA PRADESH
I N D I A
WEST BENGAL
Calcutta
BURMA
Bombay
Hyderabad
ANDHRA PRADESH
MYSORE
Madras
Mangalore
CEYLON
Bhakra Dam
Rihand Dam
Mahanadi Delta
KEY TO GRAPHS
AVERAGE MONTHLY TEMPERATURE RANGE
AVERAGE MONTHLY PRECIPITATION (in inches)
AVERAGE ANNUAL PRECIPITATION
RAINFALL VARIABILITY DURING SOUTHWEST MONSOON
Extreme excess
Moderate excess
Slight excess
About normal
Slight defect
Moderate defect
Extreme defect
1951
1954
RICE
Each dot represents 30,000 acres
COTTON
Each dot represents 30,000 acres
PEANUTS
JOWAR
Each dot represents 20,000 acres
BAJRA
Each dot represents 20,000 acres
SUGARCANE

to examine the progress of each of the provinces, wherever possible, under the first plan period. East Pakistan, which has only 15.1 per cent of the total country's land area, has over fifty-four per cent of the total population. Excluding the rivers area, East Pakistan's population density per square mile stands at 979 as compared with West Pakistan's 138 per square mile.[1] However due to the differences between the two provinces the pressure oncultivated land is believed roughly the same. Since

> . . . an acre of rice land produces from 50 to 100 per cent more of food-grains than an acre of wheat land . . . On this basis, 2.5 acres per worker in East Pakistan can be regarded as equivalent of from 3.5 to 4.5 acres of the type of land available to the worker in West Pakistan . . . This would make the pressure of population on the cultivated area equal in the two parts of the country.[2]

Excluding the Central Government's outlays on agr..ulture, water and power, East Pakistan's outlays on these categories amounted to only Rs. 570 million while West Pakistan totaled Rs. 1,410 million. While West Pakistan's total outlays on agriculture improvement doubled that of East Pakistan and Rs. 1,060 million was accounted for by expenditures on water and power (Table 20), there still was no apparent discernible impact on foodgrain production in either province. The production patterns of rice, which is grown primarily in East Pakistan and production pattern of wheat, which is grown mainly in West Pakistan, both indicate a stagnant state. A similar pattern was recorded for maize and other foodgrains (Table 22). It may be noted that flood

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[1]Waterston, p. ix.

[2]Dr. S. M. Akhtar, "Basic Features of Pakistan's Economy," <u>Economics and Commerce</u> (March, 1955), as cited in Andrus, p. 24.

way. The persistent problem, as previously mentioned, has been either too much water resulting in widespread flood damage to crops and property or not enough water resulting in drought conditions. Better water management must accompany the other measures suggested to improve agricultural productivity or these measures will be of small consequence.

Irrigation development serves to increase the land's contribution to development, first, by alleviating some of the effects of the monsoons, and secondly, not only by bringing marginal areas into production and in effect raising the amount of cultivated land used but also by increasing the gross area sown per year since more multi-cropping may be possible. Furthermore, electricity generated as a result of some projects allows the use of electrical motors for well pumping as well as facilitating measured irrigation water flow. On a more specific basis irrigation permits the following additional benefits.[1]

1. Supplying of water to cultivators who did not have alternate sources of supply.

2. Supplying of water to farming areas where rainfall distribution throughout the year fluctuates even though the total amount may be adequate.

3. Supplying of water to farms which were previously irrigated by wells which were costly and not always dependable.

4. Supplying of water to areas which will thereby become suitable for cultivation of more profitable crops.

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[1]National Council of Applied Economic Research of New Delhi, Criteria for Fixation of Water Rates and Selection of Irrigation Prospects (London: Asia Publishing House, February 1959), p. 47, hereafter cited as NCAER, February 1959.

At independence, the world's largest irrigation complex was partitioned in such a manner that Pakistan received twenty-two million acres and India the remaining forty-eight million acres. What has progressed since and how have both countries emphasized the role of irrigation in their respective agricultural sectors?

India's expenditures on major and medium irrigation during its two plan periods totaled Rs. 670 crores of which Rs. 300 crores were spent in the first period. The net added irrigated acres amounted to nine million acres, of which 6.1 million acres were added during the second period. An additional 9.5 million acres of minor irrigation were added during the decade but the expenditures incurred are difficult to determine due to the manner of reporting the results. In 1960-61 India's total net irrigated area stood at seventy million acres (Table 15 and Figure 3).

Pakistan, during the same period, has only been successful in adding about two million acres to irrigation with 1.3 million acres being added during its first plan period. Of the increased total realized during the plan all but 100,000 acres were registered in West Pakistan which reflects the difference in outlays for water and power by each province (Table 20). East Pakistan, which had funds set aside in special reserve, was unable to prepare projects due to the lack of technically qualified personnel.[1]

Lack of adequate statistics prevents any comparison of expenditures versus results between the two countries. At best it may be stated that both countries' first plan expenditures amounted to twenty-

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[1]Waterston, p. 70.

nine per cent of total plan expenditures. India, for its outlay of Rs. 585 crores, added nine million acres to irrigation via major and medium projects and 2.28 million kilowatts to capacity. Pakistan spent Rs. 177 crores and added 1.3 million acres of irrigated area and 0.9 million kilowatts of generating capacity. Neither country achieved its irrigation targets during the plan periods. Implementation was again a problem in India where at the end of the first plan only one-half of the eight million acres planned for irrigation were actually utilized because of lack of channel outlets which were not dug by the farmers and consumer resistance to charges levied for irrigation water.[1]

Perhaps more important than the results so far produced is the great potential that still exists for utilizing the existing natural resource of water. Today only about thirty-seven per cent of Pakistan's total cultivated land is irrigated. Almost all of the irrigated area is in West Pakistan where seventy-five per cent of the area sown is irrigated. This amounts to about 23.4 million acres and about three million acres are double-cropped. West Pakistan today already utilizes about seventy-one per cent of the average flow of the Indus, Jhelum and Chenab rivers and its main hope of increasing irrigation facilities lies primarily in the construction of storage sites and the use of ground water. Neither of these two possibilities has yet been fully explored. About fifty per cent of West Pakistan's irrigated area faces problems from salinity and waterlogging of formidable proportions that may require as much as Rs. 25,000 million ultimately to solve.[2]

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[1] NCAER, February 1959, p. v.

[2] PSFYP, p. 209.

In East Pakistan the irrigation potential is large. The present 0.6 million irrigated acres of land could be increased to perhaps thirteen million acres, and irrigation works could conceivably increase the amount of cultivated land from the 22.2 million acres to 26 million acres. The problems here are different from those of the dry province of West Pakistan. A major problem is regulating the flow of water over the land which slopes only about fifty feet above sea level. Storage facility sites are thus limited, and greater attention has to be paid to drainage, water diversion and pumping of surface water. Further irrigation can be expected to increase the present seven million acres that are double-cropped.

India's irrigation potential is vast. The 1960-61 total of thirty-one million acres resulting from major and medium projects have an ultimate potential of 100 million gross acres. Minor irrigation in 1960-61 amounting to 39 million acres can be extended to 75 million gross acres.

Realization of both countries' potentialities in effective use of water for irrigation will require considerable sums of capital and cannot be realistically fulfilled for a number of years. India anticipates accomplishment in twenty-five years. Because of the time lags involving lack of capital and length of gestation periods of larger projects, increasing attention must also be focused on bringing about higher yields per acre. Among the various measures that could contribute to speedy results, perhaps fertilizer is the most important. Judicious use of fertilizer can replenish the centuries-worked soils of the subcontinent and result in increased agricultural production. Its useful-

ness is amply illustrated by the high yields achieved by Japan. Pakistan in its current plan, for example, expects an important fertilizer contribution to the anticipated increase in foodgrain production. In West Pakistan seventeen per cent of the scheduled increase will come from this source and in East Pakistan fertilizer is expected to contribute thirty-three per cent of the increase.

The average yields per acre on the subcontinent are among the lowest in the world as indicated in Table 36. Cow dung, while used as a fertilizer, finds its prime use as a fuel among the villagers. Most observers agree to its value in possible increased agricultural production, but until an effective substitute for its use as a domestic fuel is found, the situation will not change. Even the villagers agree to its desirability as a manure but the men continue to use it for their smoking of waterpipes and the women for their slow-heating food preparations.[1]

TABLE 36

YIELDS PER ACRE IN SELECTED COUNTRIES
(lbs. per acre)

Country	Wheat	Paddy	Maize
Pakistan	768	1,249	946
Egypt	1,620	3,519	1,859
Japan	1,332	3,361	1,036
China	938	2,246	1,182
India	534	1,044	582
U. K.	2,166	--	--
France	1,392	2,293	946
Italy	1,218	4,522	1,719
U.S.A.	1,026	2,144	2,055

Source: Pakistan Ministry of Food and Agriculture as cited in Andrus, p. 40.

[1] "The Indian Village," A Symposium, Journal of Asian Studies (November, 1956), p. 21.

While green manures, urban and rural compost and night soil all offer potential help toward enlarging the supply of fertilizer, chemical fertilizers appear to present the best solution. What is the role of natural resources in this situation? Because such important data as capital expenditures for fertilizer plants, fertilizer distribution costs, and extent of government subsidies were not included in the government statistics, the progress of each country has to be viewed in terms of reserves, installed fertilizer plant capacities and past production.

Potash, sulfur, phosphate and nitrogen are the four raw materials upon which the chemical fertilizer industries are based. Except for nitrogen these materials are found in low quantities in India. Larger internal sources of these materials are being sought and use is made of existing supplies wherever possible. Sulphur, which must be imported, is the more important of the three. Any import substitution will have to come from the exploitation of existing pyrite reserves. Of the estimated 384 million tons of pyrites, which contain about forty per cent sulphur, only about eight million tons are proved and sixty-eight million tons are classified as probable. In view of future demand, however, imports will have to continue on an appreciable scale unless other sources are discovered.

India's soils, however, are mainly deficient in nitrogen and it is largely on this base that the country's fertilizer industry has been begun. As synthetic ammonia is the source for most of the nitrogenous fertilizer, the focus is placed on this production scheme. Gypsum at times is substituted for sulfuric acid as in the case of the

Sindri plant. Ammonium sulfate is also a by-product of coke ovens but this source does not constitute a very large part of the total capacity.

It is widely recognized that together with an assured amount of moisture, as in the case of irrigated areas, the best yields are gained through a balanced mixture of the various fertilizers. To help extend this possibility, India's current plan for nitrogenous fertilizer production includes provision in the production process to produce nitrogen-phosphate complex fertilizers. This method helps to alleviate part of the phosphate shortage, a material which also must be imported.

In the decade, 1950-51 to 1960-61, India's consumption of fertilizers (in terms of N) increased from 55,000 tons to 230,000 tons and phosphatic fertilizers (in terms of P_2O_5) from 7,000 tons to 70,000 tons. Production has been inadequate to demand (Table 16). By 1964-65 nitrogenous fertilizers are expected to reach an annual production rate of 800,000 tons, phosphatic fertilizers at 300,000 tons rate and potassic fertilizer at 160,000 tons. Table 37 sets out India's capacity status.

India's progress with chemical fertilizers presents a mixed picture. On the one hand, the quick acceptance by villagers of the idea of fertilizer application has led to a black market in fertilizer in some parts of the country; while on the other hand, a cutback in some fertilizer production was necessary due to reluctance of other villagers to use it. The "demonstration effect," while widely credited for stimulating desires on the parts of different people, has not necessarily worked throughout India regarding fertilizer application. There are villagers who will have to be persuaded that this application will

1966 may be short by as much as 300,000 tons.[1] Private industry in this case is receiving the blame for not fulfilling its scheduled supply. The private sector was to contribute sixty-eight per cent of the total output for the current plan. The private concerns are not building the plants on schedule. They have apparently been unable to get foreign collaboration, some price concessions and guarantees from the government and are hampered by recently imposed import duties and taxes on corporate profits. The increased import duties on machinery and the new taxes are needed to meet defense requirements.

Pakistan, while having extensive reserves of sulfur near the Afghanistan border, is unable to use these deposits due to their inaccessibility and almost complete lack of water in the area. The deposits, though on the surface, are at elevations of 5,200 and 6,000 feet and are located in mountainous terrain.[2] Pyrites in the Salt Range of West Pakistan provide ample resources for sulfuric acid production. While phosphate resources are small, gypsum deposits appear adequate and the development of Sui natural gas fields provides a base for production of ammonium sulfate fertilizer.

Pakistan's first plan as previously mentioned called for 360,000 tons of ammonium sulfate equivalent to be produced and distributed; however, the rate of production only reached 160,000 tons in the last year of the plan. The current plan period estimates the following consumption increases; nitrogen up from 32,000 tons to 120,000 tons, phosphoric

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[1]India's Fertilizer Output May not Meet Goal," Chemical and Engineering News (July 1, 1963), pp. 48-49.

[2]R. E. Platt (ed.), Pakistan, A Compendium (New York: American Geographical Society, 1961), p. 344.

acid to increase from 1,000 tons to 76,000 tons and potash up from zero to 8,000 tons.[1] Pakistan's present fertilizer capacity status is depicted in Table 38.

TABLE 38

PAKISTAN FERTILIZER PLANTS AND CAPACITY

Location	Product and Capacity
Daudkhel[a]	Ammonium sulphate, 50,000 tons
Lyallpur[a]	Superphosphate, 18,000 tons
Multan	Ammonium nitrate 103,000 tons Urea, 59,000 tons
Fenchuganj	Urea, 119,000 tons

Source: PSFYP, p. 242.

[a]Plants in operation at end of first plan period.

As is evident by the two countries' experience since independence, the uses of chemical fertilizer application is just slowly beginning to take hold. Except for its limited use on various plantation type crops, very little has been utilized in the past. A problem attendant to its widespread use is the lack of knowledge of what kinds should be used, in what quantities and at what times of the year in relation to the different soil conditions that exist on the subcontinent. This kind of knowledge is essential if the contribution of existing soils is to be heightened, yields per acre increased and optimum use of fertilizers made. India has begun the search for such information by establishing

[1]PSFYP, p. 137.

four regional study centers, one for each of the four main soil groups found on the subcontinent.

Pakistan has a soil classification scheme under consideration. Some spot soil fertility surveys have been made and response of crops to different fertilizers studied, but this is just the start of the bigger task ahead.

In turning to the other components of the agricultural sector, the roles of fisheries and animal husbandrymerit examination. The importance of improving fisheries developments stems from this industry's ability to contribute directly to the subcontinent's supply of food, a more balanced diet for the population and foreign exchange earnings from exports. Despite thousands of miles of seacoast and rivers and hundreds of thousands of square miles of continental shelf neither nation has seen fit to utilize even a small portion of this existing marine resource. Canning facilities of all types are generally lacking thus precluding export possibilities.

Pakistan, for instance, is exploiting only about five per cent of its available marine resource. The obvious limiting factors are the need for a larger fishing fleet that is motorized and employs modern net materials as well as refrigerated transportation.[1] From a production of 243,000 tons in 1952 output rose only slightly in 1959-60 to 290,000 tons.

India's progress in fisheries development also has been minimal. Facing problems similar to Pakistan, the country is presently emphasizing demonstration fish farms, fisheries cooperatives and cold storage

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[1]"Nutrition Survey of the Armed Forces of Pakistan," Journal of Nutrition--Supplement 2 (July, 1959), p. 16.

facilities at various ports. In 1952 fish production amounted to only 744,000 tons, as opposed, for instance, to Japan's 4.8 million tons in the same year.[1] Current Indian production of about 1.4 million tons is expected to increase only slightly to 1.8 million tons by 1965-66. According to May[2] the caste system also tends to limit progress in this field because of the conservatism associated with the fishermen who are generally relegated to the lower castes by virtue of their occupation. Caste, though outlawed by the Indian constitution and declared un-Islamic in Pakistan, is still practiced in both countries, especially in the rural areas. This represents but another long-range problem that needs to be solved for it is inimical to social mobility which in turn is considered a necessary condition for national economic development.[3] This seems a high price to pay in view of the food situation on the subcontinent and the lack of any apparent taboo concerning fish consumption.

In other areas of food consumption, religious or traditional habits limit progress. Some Hindus will not eat eggs for religious

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[1] United Nations Statistical Yearbook, p. 118.

[2] May, p. 213.

[3] P. T. Bauer sums up some of the more undesirable economic effects of the caste system in United States and Indian Economic Development (Washington: American Enterprise Association, November, 1959), p. 13, when he states: "For a long time now, both the system and the attitudes it reflects and also reinforces have been damaging to material progress. The system wastes talent (in preventing very large numbers of people from pursuing work more productive than that in which they are engaged), it restricts occupational mobility, and also retards the dissemination of new ideas and methods . . . it results in enforced uneconomic division of labor, and also in otherwise unnecessary or even enforced duplication of equipment (including even simple tools) and of facilities, when these cannot be used by members of different castes." See also R. O. Tilman, "The Influence of Caste on Indian Economic Development" in R. Brainbanti and J. Spengler (eds.), Administration and Economic Development in India (Durham: Duke University Press, 1963), pp. 202-223.

reasons. Eggs are also looked upon primarily as a source of income and are usually sold rather than eaten by many villagers. Poultry as a source of food is undeveloped on the subcontinent. Being classified as a scavenger, the chicken is not a popular consumption food with many. Even so, the egg laying capacity of a hen is only fifty eggs per year, and development along these lines could complement villagers' incomes.

Vegetables are considered in many villages to be a delicacy and not a dietary necessity. Projects to promote fruit orchards have tended to meet with little success especially in areas where local traditions allow everyone to partake of the fruit of a tree regardless of ownership.[1] The problems attending meat consumption on the subcontinent are well known with pork being repugnant to the Muslims and cattle being considered sacred by the Hindus.

All students of the subcontinent must sooner or later address themselves to the cattle situation that exists and in some unpresumptious manner make suggestions as to its possible solution. It is the belief of this writer that any rationalization of this essentially religious question will have to come from those quarters in India that are most concerned with such matters. However, since cattle serve not only as religious symbols but also have an economic function, perhaps rationalization would be easier if parts of their economic function were removed.

In addition to providing milk, the chief function of cattle is to provide draft power. They pull the plows in the field and carts on the roads. They are largely inefficient in all their functions despite

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[1]"The Indian Village . . .," p. 20, p. 23.

their 159 million number. The cattle are in a generally weakened condition due to insufficient food and hence the pulling ability and capacity to yield milk is low. The buffaloes actually outproduce the cattle in milk yields with average yield per lactation being 1,100 pounds and 400 pounds respectively. This may be compared to 5,000 pounds in western countries. Millions of the cattle are useless and uneconomic and due to prohibition of slaughter contribute to the heavy pressure on what pasture lands and fodder supplies exist and hold back development of the more useful animals.

Most solutions seem to center on methods of improving the efficiency of the cattle rather than actually removing some of their functions. The Indian government is attempting to control the size and improve the quality of its cattle population. This is commendable and a very necessary first step. Program attempts at scrub bull castration, introduction of pedigreed bulls and artificial insemination centers have had some success, if only modest.

It seems a reasonable prediction that at some future date the draft power function of cattle will be replaced by some other mode of power. It is also a reasonable prediction that using the present methods and experience to date success in controlling the cattle population will be slow. The control measures have been started but what of the technological gap that has to be solved?

Some indications of progress in other countries that have in the past been using primarily draft animals are becoming evident. Japan, the more frequently cited example of agricultural efficiency on small plots of ground, has been introducing garden-type tractors into its

agricultural sector with greater frequency.

Indian conditions indicate the need for mechanically powered tractors which would meet the various soil conditions, would be less expensive than a pair of bullocks and yet perform most of the economic functions of a bullock. The tractor would have to be designed with a view of replacing bullocks rather than men at this point in Indian development. It would have to be capable of using any type of combustible fuel which would imply a steam engine of some sort. A prototype of such an engine was announced in England as far back as 1954[1] but nothing more was heard regarding its feasibility.

The Landmaster, Ltd., a British concern, has developed a tiller with attachments for twenty-one different types of jobs including wheel attachments for any soil condition, waterproof sealing for rice paddy work and a trailer for hauling. This machine meets the price of a pair of bullocks, but is apparently gasoline fueled. Because of the shortage of oil resources on the subcontinent, its widespread use would be limited, although India has been encouraging importation of tractors by giving exemption from customs duties and local taxes.[2]

The technological reports are encouraging and, coupled with successes in holding down the numbers of cattle, the outlook, not only for animal husbandry, but also for the introduction of more efficient agricultural methods appears brighter.

Pakistan, while not having a religious problem, does have

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[1] "Better Than a Bullock," The Economist (September 25, 1954), p. 1011.

[2] "A Market of 1.9 Billion People," News Front (February, 1964), p. 15.

problems similar to India in regard to its cattle. Of the some twenty-four million cattle in Pakistan more than fourteen million are in East Pakistan. Here the cattle population is competing with men for land and the low supplies of fodder have forced the province to reduce the number of cattle by limiting the amount of livestock a farmer can own.

Despite possessing perhaps the best breeding herds on the sub-continent, West Pakistan has a shortage of good draft animals. The demand for these animals has grown with the increased cultivation now made possible by the various irrigation projects. However, land for grazing is also in short supply and fodder supplies are under pressure. The answer to this problem seems to be an expansion of multi-cropping wherever possible. Here as in India mechanization in agriculture can only be expected in specialized forms and at a slow rate.

In analyzing the various segments of the agricultural sector it appears that both nations have well in mind the seriousness of their problems as well as the measures available to solve them. In some areas change was more smoothly achieved than in others. India moved quickly, for example, with land reforms and is well on the way toward widespread implementation. Pakistan, especially West Pakistan, had to await the arrival of its present regime before any reforms were forth-coming.

The precise role which land reforms play in economic development has yet to be defined. It is generally agreed that they provide farmers with incentives to take greater care with their farming and should result in increasing their incomes. Reforms also help abolish the old evils attendent with large absentee ownership of land. Reforms

bring about rent reductions, provide tenure security and tend to bring about political stability where land ownership is a burning issue.

What is yet not known is the optimum size of a holding.[1] Some measures may call for dividing up larger holdings into smaller more evenly distributed holdings while, on the other hand, the same reform program may call for consolidating into cooperative farms small plots of ground that have been unduly fragmented usually as a result of inheritance tradition.[2] More research is needed to determine the size of far... to productivity if land reforms are to be truly effective. Aside from the capital and planning problems encountered by both countries in their agricultural sectors, the main difficulty appears to revolve around organizational and personnel considerations regarding the implementation of the various solutions. It will be recalled that the means by which the agrarian structures of both nations are to be changed are through India's community development organization and Pakistan's village aid agency. The problems these two organizations have had during the plan periods regarding the extent of individual responsibility on all levels, the numbers of persons now employed, their training and difficulties in recruiting talented persons have all been set out in the previous chapters. It is of great importance that these organizational problems be solved speedily because a large part of the education of the villagers in the many new methods needed to increase

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[1]Recent studies cast doubt on the belief that larger sized farms are more efficient than smaller sized farms. See E. J. Lang, "Economic Basis of Land Reform in Underdeveloped Economies," Land Economies (May, 1961), and B. Singh, Next Step in Village India (Bombay: Asia Publishing House, 1961).

[2]P. Koran, "Land Utilization and Agriculture in an Indian Village," Land Economics (February, 1957), p. 60, points out in his study that a farm plot today is roughly two-thirds of what it was forty years ago.

the productivity of agriculture depends on their solution.

The extent to which the villagers will use better seeds, implements, fertilizers, plant protection methods, anti-erosion measures, better crop patterns, irrigation water, dry framing techniques and a host of other measures will depend to a great extent on the effectiveness of these organizations. It has been said that the farmers are willing and eager to accept innovations that will benefit them. Perhaps this is so; however, many instances of reluctance on the part of villagers are also in evidence. Traditional methods may be difficult to change.

In many cases action called for on the part of the peasant involves some risk and hence accounts for his conservatism. In a subsistence environment where risk involves eating or not eating the resistance in unknown or unproved methods is understandable. The future manner in which these extension and project personnel teach, explain, demonstrate, persuade and motivate the millions of farmers will be a large factor to the success or failure of natural resource utilization in the agricultural sectors of India and Pakistan.

Summary and Conclusions

The agricultural sector continues to be the dominant sector in the economies of Pakistan and India. Both countries gave agriculture, irrigation and power top priority in their first plans by allocating over forty per cent of their total planned expenditures to programs in these areas. However, in India's second plan period such allocations declined to thirty per cent of the total plan.

India's foodgrain production rose steadily during its two

plan periods but the rate of population growth also rose. Pakistan's production of foodgrains stagnated while its population continued to increase. Thus, since independence, neither country has been able to become self-sufficient in food and have both faced famine conditions on a number of occasions. Their per capita calorie intake has declined appreciably from pre-World War II levels and neither nation has been able to reach the minimum daily reference standard of 2,300 calories per person. The failure to achieve targets in the agriculture sector has led to political problems and has forced revision and curtailment of development projects elsewhere in both economies.

Their experience provides a good example of the importance and role of the natural resource of land to a nation's economy. The observable aspects have revealed both positive and negative effects. Had there been more readily available land on which to expand food production the present pressure would have been less intense and the effects of any miscalculations less damaging. Since this kind of expansion is not possible, far-reaching changes in the present agricultural structures are needed. Fortunately, the land resources appear sufficient to offer hope in solving the problem. Considering the present size of both populations and their heavy dependence on agriculture for a livelihood, the pressure on land resources could have been even greater.

The agricultural experience of India and Pakistan serves to point up the changes that have gradually come about in the basic relationship between their populations and the land available to them for agricultural pursuits. Pakistan and India presently face a land shortage. Contributing to the land scarcity are the rapidly growing

populations and the continued use of outmoded agricultural methods. Complicating the relationship further is the monsoon environment in which they live.

Solution of the agricultural dilemma requires a new mode of operation which takes into greater account the unpredictable monsoon climate as well as some brake on population growth. India and Pakistan have demonstrated an awareness of the basic problems involved. The two nations have attacked the problems in a similar fashion and their relative progress has varied from project to project.

Recognition of the population aspects of the problem has not as yet resulted in any strong concentrated effort to institute widespread birth control measures in either country although India has placed greater relative emphasis on such programs than has Pakistan. The latter is only in the pilot stage at present while the former has set up thousands of rural and urban clinics and has adopted family planning as an official policy. As there are no absolute religious bars to such a policy in either country, birth control could conceivably help to relieve some of the pressure on the land. However, because of the time factor involved, increased allocations for additional facilities and trained personnel will be needed soon in both countries if such a policy is to be successful and have an impact in the near future.

The limited supply of the important natural resource of land not only has placed a heavy burden on both nations, but also has forced a re-evaluation of the manner in which agriculture has been conducted. The agrarian structures of both countries must be reorganized if increased productivity is to be achieved. Increased productivity

is essential if the people are to be fed and other development plans are to succeed. Expansion onto new land is severely limited. Additional labor inputs will not solve the problem since a surplus of rural labor already exists. Widespread substitution of rural labor by technological improvements would only serve to increase unemployment.

The obvious solution to the agricultural problem calls for a concerted effort to raise the productivity of the land through the introduction of new technology. This solution has often been suggested as a way to cure many of the ills suffered by underdeveloped countries. While sounding plausible and neat, this remedy, upon examination in terms of the subcontinent's experience, is in reality a very complex process and fraught with obstacles. Unfortunately the simplicity of the proposition may leave the impression that its implementation is also relati... simple and unless broadly qualified such blanket statements can be considered to be of limited value.

There is a reciprocal relationship between natural resources and advanced methods of operation. To recognize that both are needed to achieve a given goal and that substitution will probably be partial rather than whole is to acknowledge that both technology and land have a role to play in the solution. New methods which have been developed and used successfully in one country may not necessarily be of the same value to another country. Each country has its own peculiar set of circumstances that must be considered and any new technologies that are introduced must be tailored to meet these needs.

Enhancement of the land through the introduction of new methods can be a very difficult matter. Research is required to find

the appropriate technology, capital is needed to obtain it and education and incentives must be made available to allow its application.

The process also demands widespread changes in other spheres of activity. It requires improving the farmer's knowledge, his tools and his draft, dairy and other animals. This in turn calls for the upgrading and expansion of educational facilities, research and development of implements that best suit the needs of the diverse agricultural conditions within the country and animal husbandry programs.

Implementation of the process further requires better water management and the attendant irrigation, flood control, dam and power projects. Better land and crop management is needed which requires disease and pest control, new seeds and land conservation methods. Increased fertilizer production and consumption is also needed. Finally, agricultural organizations and agencies must be established which can effectively translate these new ideas and methods into workable schemes which the farmer will find desirable and be willing to use. Thus, while technology will undoubtedly play a major role in the future of agriculture on the subcontinent, its reciprocal relationship to land, water and other natural resources in the coming transformation should not be overlooked.

The agricultural sectors of both nations are the most crucial areas in need of attention at present. India and Pakistan must renew their efforts to assure greater success in meeting agricultural targets by assigning high priorities to such programs and providing the necessary incentives to attract talented people to the sector's activities. These sectors must receive more emphasis if their role in the economy

is to shift from one of an inhibitor to one of a contributor. This is not to imply that some significant strides have not already occurred in these sectors, but only to point out that the progress to date has not been sufficient to provide an assured food supply.

The fact that famines have been recurring should be warning enough that greater emphasis on the agricultural sectors is needed. Both nations have a shortage of foreign exchange and are unable readily to resort to food importation without seriously affecting other development programs. Neither government can hope to retain the confidence of its people, a factor so necessary at this stage of their development, unless the food problem is solved. Both countries should be well aware of the merits of political stability in light of their recent history. Political instability has plagued Pakistan and has contributed to its late start in planning and failure to achieve many of its targets; while in India, the relative calm has served as an asset to the achievement of its development programs.

While serious consequences have been averted in the past, especially in India, by the imports of wheat from Western countries, this can hardly be viewed as a solution to the basic problem. The magnitude of the problem requires its solution to come from within Pakistan and India. Figures concerning population growth and land available for cultivation suggest pressure on land resources increasing in the future, with the pressure being more intense in Pakistan where the cultivated land per person will amount to 0.44 acres in 1975 as compared to India's 0.60 acres per capita in the same time period.

The possession by both nations of relatively large land bases

and large quantities of underutilized water resources provide them with potential for coping with food shortages. The two areas that would appear to offer the most promising means of increasing food production are irrigation and fertilizer. While India's progress in irrigation has been dramatic with about 22 million new acres having been added, its unrealized potential stands at about 105 million acres. Pakistan has been able to add only about 2 million acres since independence; however, East Pakistan has an opportunity to add about 12.5 million acres to its irrigated total.

More efficient use of the potential water resources will involve sizeable expenditures, but the benefits that can be expected are also sizeable. It is the key to removing a large part of the present dependence on the monsoons to ameliorate some of its damaging effects. Better water control will enhance existing land resources, provide more irrigated land which should increase the ability to double-crop, give greater assurance to some areas of a dependable water supply and also help to insure more effective use of fertilizer.

Fertilizer efficiency requires not only an assured water supply but also a knowledge of the condition of the soil on to which it will be applied. Soil surveys are called for, therefore, if the present low yields per acre are to be raised. Pakistan has done very little in gathering such information while India has already established four soil research institutes and has taken numerous soil samples. The results of such inquiries will help to determine what fertilizers are needed and in what quantities to achieve desired yields per acre. Potash, sulphur and phosphate resources are meager in India. Large reserves of sulphur

bringing about the necessary changes at the village levels, need to be strengthened with additional and more talented personnel. Programs to attract the services of such persons are needed.

CHAPTER V

POWER DEVELOPMENT AND FUELS

The consumption of power has been generally accepted as an indication of the level of economic development of a country. Pakistan and India have levels considerably lower than those found in more developed countries. In terms of coal equivalent energy, Pakistan's per capita energy consumption in 1960 stood at 67 kilograms while India's per capita figure for the same year was 140 kilograms. By way of comparison, Mexico in 1960 consumed 1,012 kilograms per head, Denmark and Japan had consumption figures of 2,821 kilograms and 1,164 kilograms respectively.[1]

While the power sector's contribution to gross product may be small, the extent of its availability can be a decisive factor in whether economic growth is to be stimulated or hindered.[2] Power constitutes an essential element in a country's infra-structure which in turn is one of the basic requirements of economic development. The major significance of power installations to economic development lies in the ability of power to contribute to revitalizing the agrarian sectors as well as providing some of the bases for industrialization and increasing efficiency in the other sectors of the economy.

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[1] United Nations Statistical Yearbook, pp. 278-280.

[2] National Council for Applied Economic Research, New Delhi, Demand for Energy in India, 1960-75 (Bombay: Asia Publishing House, 1960), p. 1, hereafter cited in NCAER, January, 1960.

The part played by natural resources in power development is a direct one because it is on the base of these resources that the different power facilities are likely to rest. The variety, quality and extent of these resources help to determine the direction of power development and influence as well the direction of the overall economic development.

This chapter will be concerned with the bases available for power development in India and Pakistan, the progress made in utilizing these resources as well as the role of power in the economic development of each country.

As power is just one of the means through which certain ends are accomplished, there is no easy answer as to whether power per se is a major limiting factor to present economic development on the subcontinent. The creation of new power capacity is dependent on other economic activities from which stem a demand for power. The projects, whether they be in industry or agriculture, in turn depend on the availability of power, hence a close interrelationship exists. Present opinion is that existing power facilities in some areas of both countries are just able to keep up with demand while other areas, such as East Pakistan, have a power shortage. Further, there is a need for expansion not only to overcome the periodic power crises that arise when breakdowns occur but also to assure that power will not be a serious limiting factor to economic development in the future.

Even though electrical power is not the chief form of energy presently used on the subcontinent, it will receive major emphasis in this study due to its potentially important role. Electricity is

recognized as an advanced type of energy which has had a significant influence on the industrial development of countries in the past. ". . . industrial development, mechanization and urban progress are virtually a function of electricity supplies"[1] and in many applications electricity has no rivals.

The role that natural resources will have in power development can perhaps be best discussed by analyzing previous patterns of consumption, where the future demand will be, and each country's availability of resources to meet this demand.

The consumption of electric power to date has largely been by the industrial concerns of both nations. Industry has been not only the main consumer but is also an important producer as well. In India, industry accounts for about seventy-two per cent of the public utility electrical sales, domestic use about ten per cent with traction, commercial and small power, public water works and public lighting consuming the rest (Table 39).

Increasing demand in the rural areas of both countries will stem from small and cottage scale industry requirements for electricity as the drive toward rural diversification continues. Other sources of demand will come from irrigation activities, flood control, well pumping and residential and public lighting. Rural electrification progress has been understandably slow in both countries because load factors and distances between villages make electrification relatively uneconomic,[2]

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[1]NCAER, January, 1960, p. 34.

[2]United Nations Ec [illegible] Far East, Electric Power in Asia a [illegible] Nations, 1962, p. 26,

TABLE 39

SALES OF ELECTRICITY IN INDIA
(million KWH)

Purpose	1950	1955	1960	1961
Industrial Power	2,605 (62.7)	4,590 (66.3)	9,238 (69.3)	11,367 (71.9)
Domestic Use	524 (12.6)	810 (11.7)	1,391 (10.4)	1,534 (9.7)
Traction	308 (7.4)	402 (5.8)	448 (3.4)	506 (3.2)
Commercial Light and Small Power	308 (7.4)	474 (6.8)	838 (6.3)	885 (5.6)
Public Water Works, etc.	190 (4.6)	294 (4.3)	451 (3.4)	459 (2.9)
Irrigation, etc.	162 (3.9)	258 (3.7)	779 (5.8)	854 (5.4)
Public Lighting	60 (1.4)	98 (1.4)	190 (1.4)	205 (1.3)
Total sold	4,157 (100.0)	6,926 (100.0)	13,335 (100.0)	15,810 (100.0)
Total generated	5,112	8,592	16,428	19,110

Source: Indian Investment Center, Investing in India (Bombay: Vakil and Sons [Private] Ltd., June, 1962), p. 16.

Note: Data relate to public utilities only, but exclude energy generated by industrial units for their consumption. Figures in brackets are percentages of the total.

but this situation can be expected to change as development continues.

Industry, however, can be expected to be themajor consumer of electrical power in the future. In Pakistan, as textile, cement,

fertilizer, paper and various secondary industries expand to meet demand, the need for electricity will also be expanding. In India a recent study (Table 40) revealed the demand for electricity by industry rising from 12,400 million KWH in 1960 to 82,500 KWH by 1975. Among India's industrial sections of mining, small enterprises, construction and factory establishments, the factories are the main electricity consumers. The growth pattern within these manufacturing units is toward heavy intensive-energy activities such as iron and steel and other heavy industry.

TABLE 40[a]

ESTIMATE OF DEMAND FOR ELECTRICITY IN INDIA, 1955-75
(million KWH)

Sector	1955	1960	1965	1970	1975
Agriculture (irrigation)	255	510	970	1,750	3,000
Industry	6,445	12,400	24,500	45,500	82,500
Domestic demand:					
Urban: Light and fans	679	1,062	1,665	2,460	3,800
Heat	157	322	667	1,320	2,712
Rural:	14	38	108	306	929
Total Domestic	850	1,422	2,440	4,086	7,441
Services	905	1,450	2,450	3,970	6,850
Transport	515	920	1,520	2,250	3,170
Total effective electricity	8,970	16,702	31,880	57,556	102,961
Industrial index approach	9,000	17,000	33,600	61,500	108,000

Source: NCAER, January, 1960, p. 46.

[a]Estimates are based on model of economic growth that aims at doubling per capita income from Rs. 281 in 1955-56 to Rs. 564 in 1975-1976.

Aside from industrial by-products provided by refineries and coke oven gases, the resources available for power development on the

subcontinent include water flow, natural gas, coal, lignite, oil, peat and atomic materials. While wind, tidal and solar sources of power do exist, their importance has yet to be determined and their role in present power development is not likely to be of much significance.

Resource Base for Hydro-Power and Utilization

Besides the previously mentioned irrigation and flood control benefits stemming from better water management policies, there is also the important additional asset of hydro-electric power generation. The outstanding feature of water as a source of generating electricity is that it is a renewable resource. At independence, Pakistan's share of undivided India's major hydro-electric generating capacity was only 9,600 kw out of the total existing capacity of 404,510 kw.[1] Pakistan, however, possesses a sizeable hydro-electric power potential. The West Pakistan Indus Basin has a potential of about 8.3 million kw, of which six million kw are located on the Indus river basin. The Jhelum river accounts for about two million kw of the potential with the Kabul, Swat and other rivers accounting for the rest. Other areas in this section of Pakistan have either a negligible potential or have not been adequately surveyed to date to provide an estimate. Of the total potential about 200,000 kw has been developed.

East Pakistan possesses a potential of about one million kw. The best site locations are in the Chittagong hill area where 300,000 kw could be developed. The Brahmaputra system and other areas make up the remaining potential in this section of Pakistan. To date only

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[1] Vakil, p. 231.

120,000 kw capacity is being developed on the Karnafuli River.

In 1960 Pakistan had eight public utility hydro-electric stations with an aggregate installed capacity over 250,000 kw and an aggregate production of 538.7 million KWH at an average plant factor of 24.3 per cent[1] as compared to Mexico's capacity of 1.25 million kw and production of 4.9 billion KWH.[2] As shown in Table 41 the hydro-electric installed capacity target for 1965 forecasts about a fifty-three per cent increase over 1960. However, the installed capacity of 383,000 kw will represent

TABLE 41

PAKISTAN'S NET INSTALLED POWER CAPACITY BY MODE OF GENERATION, 1955-65
(000 kilowatts)

Source	Installed Capacity 1955	Installed Capacity 1960	Net Installed Capacity 1965	Percentage Difference
Public Utilities:				
Hydro	62.7	250.7	382.7	52.7
Steam	67.7	312.8	612.3	95.7
Diesel	70.7	90.0	95.3	5.9
Sub-total	200.4	653.5	1,090.3	70.0
Industrial Establishments	142.0	252.0	181.5	-28.0
Grand total	342.4	905.5	1,271.8	40.3
Per capita consumption[a]	10 KWH	30 KWH	50 KWH	

Source: PSFYP, p. 213.

[a]The low level of consumption was only a small fracti[illegible] the 1995 KWH in the United States in 1910.

[1]ECAFE, Electric Power, p. 87.

[2]United Nations Statistical Yearbook, 1961, pp. 292-301.

generating about five million kw through its hydro plants or about twelve per cent of its potential (Table 42).

TABLE 42

INDIAN GENERATING CAPACITY BY SOURCE
(million kilowatts)

Source	1951	1956	1961	1966
Hydel Plant	0.56	0.94	1.93	5.10
Coal	1.59	2.27	3.46	7.03
Oil	0.15	0.21	0.31	0.36
Nuclear	--	--	--	--
Total	2.30	3.42	5.70	12.69

Source: ITFYP, p. 195.

While hydro power is usually considered to be the cheapest among the various sources of power, its initial development may represent huge outlays and require extensive transmission facilities where the sites, by virtue of their peculiar nature, may be located in inconvenient or remote parts of the country. In other cases, however, where hydro stations are a part of a multi-purpose project and water resources are in juxtaposition with other required resources, regional development can take place.

Some recent Indian capital costs studies of single-purpose hydro power projects revealed a wide range of costs that were largely due to the particular topographical and hydrological conditions of the given site. The Sharavati scheme in Mysore, for instance, cost Rs 550 per kw while the expenditures on the Rihand project in Uttar Pradesh were

Rs 1,545 per kw.[1] In cases where multi schemes were built, the costs were higher as were the benefits. Due to events expected to occur in other power sectors which will be covered later in this study, hydro power capital costs are expected to compare favorably to other power forms in the future.

TABLE 43

AVERAGE CAPITAL COSTS FOR DIFFERENT TYPES OF ELECTRICITY SUPPLY FACILITIES IN INDIA

Type of Facility	Foreign Exchange Component (per cent)	Approx. Cost per KW of Installed Capacity (rupees) Range	Representative Avg.
Hydro Power Station	15	500-1700	1,100
Steam Power Station	64	800-1000	900
Diesel Power Station	50	570-1200	800
Transmission Systems	25	320-450	380
Distribution Systems	2	450-550	500

Source: United Nations Economic Commission for Asia and the Far East, Proceedings of the Regional Seminar on Energy Sources and Electric Power Development (New York: United Nations, 1962), p. 68, hereafter cited as ECAFE, Energy Sources.

Resource Bases for Thermal Power and Utilization

Examination of capacity figures after partition show Pakistan's thermal station capacity amounted to 54,630 kw with all but 3,000 kw located in West Pakistan.[2] India's position was considerably better with 878,000 kw.[3] By way of relative progress, in 1960 India had 627

[1] NCAER, January, 1960, p. 107.

[2] Andrus, p. 215.

[3] Vakil, p. 234.

public utility diesel stations and ninety-three steam stations having an aggregate installed capacity of 2.71 million kw with Pakistan having sixty-one public utility diesel stations and thirteen steam stations representing over 402,000 kilowatts of installed capacity.[1] In the same year the capacity in Mexico and Japan amounted to 1.05 million kw and 8.87 million kw respectively.[2]

The energy sources for India's thermal stations are lignite, natural gas, oil and coal with some atomic energy being slowly introduced. India's total lignite reserves amount to about 2,500 million tons (Figure 4) of which 2,000 million tons are located in the Neyveli area in Madras. About 1,400 million tons of this deposit is readily available for exploitation.

Until recently the lignite natural resources of India had largely been unused but due to a combination of factors the Neyveli complex scheme provides an example of how an indigenous natural resource, once considered uneconomical to exploit, has now been put to use and serves as the base from which regional economic development can take place. Bottlenecks in coal production and transportation, high costs of coal from northernmines and near exhaustion of the hydro-electric power potential in Madras state have all contributed to the establishment of India's first large-scale utilization of lignite as a source of thermal generation of power. With the exception of the inferior coal deposits of Singareni located north of Hyderabad there is no mineral fuel known to exist in South India except for lignite.[3]

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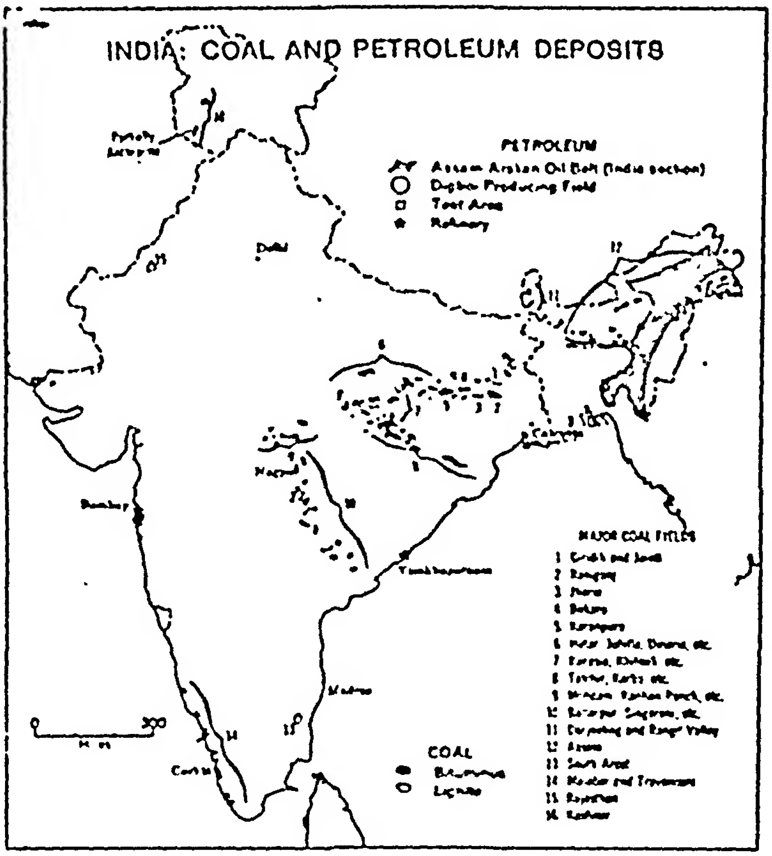
[1]ESCAFE, Electric Power, pp. 85-89.

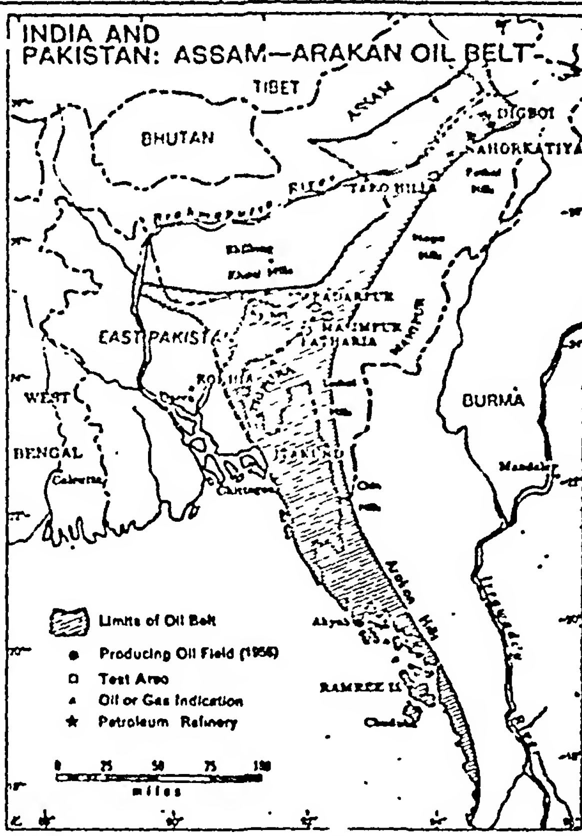
[2]United Nations Statistical Yearbook, pp. 292-294.

[3]United Nations ...c Co... for ...the Far East,

Fig. 4.--India: Coal and Petroleum Deposits
India and Pakistan: Assam-Arakan Oil Belt

Source: Platt (ed.), India, p. 336.


INDIA: COAL AND PETROLEUM DEPOSITS
PETROLEUM
Assam Arakan Oil Belt (India section)
Digboi Producing Field
Test Area
Refinery
Delhi
Bombay
Calcutta
Madras
0 300
COAL
Bituminous
Lignite
MAJOR COAL FIELDS


INDIA AND
PAKISTAN: ASSAM—ARAKAN OIL BELT
TIBET
BHUTAN
ASSAM
DIGBOI
NAHORKATIYA
Brahmaputra
EAST PAKISTAN
WEST
BENGAL
Calcutta
Chittagong
BURMA
Mandalay
Akyab
RAMREE I.
Limits of Oil Belt
Producing Oil Field (1956)
Test Area
Oil or Gas Indication
Petroleum Refinery
0 25 50 75 100
miles

plastics industries; kerosene and middle oils will also be produced and finally, if present pilot experiments in East Germany prove successful, lignite products may be used forsmelting of the large iron ore deposits from nearby Salem.

Other benefits include the gradual replacement of cow dung for fuel, conservation of standing timber to prevent soil erosion, expansion of cultivated land into areas now being used for the planting of casuarina trees used as firewood and finally, to moderate the political climate of the region through industrial development.

The thermal station will ultimately be generating 1,000 mw of electricity and will be integrated into the hydro-electric power grid. Here, as in other parts of India and Pakistan, the power grids are being meshed so as to sustain a constant supply of power and eliminate the power shortages that have become common during drought periods in areas that depend primarily on a hydro-electric power supply.

Natural gas can also be used for thermal power generation, but its relative importance in India to other available resources is small. The only place where it is known to exist in any quantity is Nahorkatiya, Assam, where a gas turbined 67,000 kw station is being established and will utilize 5.5 million cubic feet per day. Local cement and fertilizer industries will utilize the bulk of the natural gas. This natural gas reserve may also be used to isolate ethylene, butane and other hydrocarbons to make them available to petrochemical industries. Some discoveries of natural gas have been reported in Gujarat state, but no estimates as to their extent are available.

Oil, too, can be used for thermal power generation, and while

much has been written about the possibilities of future oil discoveries in India, especially in the Assam-Arakan oil belt (Figure 4), the presently known reserves are modest and are reflected in the minor contribution they make to electric generating capacity (Table 42). India's petroleum reserves are estimated to be only 375 million barrels (Table 44) and are found in the Digboi and Nahorkatiya areas of Assam with more reserves expected to be added by the new discovery in the Cambray area of Gujarat.

TABLE 44

PETROLEUM SUPPLY AND DEMAND OF INDIA AND PAKISTAN, 1960

Item	India	Pakistan
	(Barrels per day unless otherwise noted)	
Reserves (million barrels)	375	20
Crude Oil Production	9,246	7,226
Crude Oil Exports	0	0
Crude Oil Imports	103,000	0
Petroleum Refining Capacity	116,100	8,000
Petroleum Refining Capacity under Construction	55,000	30,000
Petroleum Refining Capacity Planned	30,000	-
Petroleum Refining Crude Throughput	110,000	6,173
Refined Products Exports	0	0
Refined Products Imports	40,000	36,000
Petroleum Consumption	150,000	41,900
Per Capita Consumption (U.S. Gallons)	5.65	7.31
% Value of Petroleum to Total Value of Exports on (Imports)	(8.8%)	(9.9%)

Source: United Nations Economic Commission for Asia and the Far East, Mining Developments in Asia and the Far East, 1960 (Bangkok: United Nations, 1962).

India's curren utilizatio dom source is about 8,000

refineries at Gujarat, Cochin and Madras for a combined expansion of about 200,000 barrels per day.[1] The expansion of refinery capacity should result in an increase in the consumption of furnace oil for thermal generation in the future with such thermal stations being located close to the sites of the refineries. The diesel oil contribution to thermal power will probably decrease due to the demand for this product in other sectors. It is expected that thirty-five per cent of the nation's diesel oil requirements will have to be imported by 1965-66.[2]

The lack of this natural resource not only hampers its contribution to thermal generation of electricity, but also serves as a disadvantage to the overall economy, especially in view of the expected rising demand. It has been estimated that in order to meet the forecasted gross demand for petroleum of 29.5 million tons in 1975, the refining capacity of crude must increase from the current 5 million tons level to 30 million tons and the supply of indigenous oil must increase from 3 million tons in 1960 to 24 million tons by 1975.[3] Even in the event that these conditions should be met only a small fraction of the total estimated electricity demand would be met from petroleum fuels for they will be needed in other applications throughout the economy.

India has not been very successful in its oil explorations and perhaps because of some of the terms offered to invited foreign concerns has not yet launched a broad search program. The second plan period

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[1] The Oil and Gas Journal (January 27, 1964), p. 99.

[2] ECAFE, Energy Sources, p. 140.

[3] NCAER, January 1960, p. 112

saw the establishment of the Oil and Natural Gas Commission, but only Rs. 26 crores were spent on oil exploration and this despite the thousands of square miles of sedimentary rock formations known to exist and which invite exploration. There appears to be a potential for future discoveries but exploration activity must be increased. Should there be some large discoveries in oil in the future the pattern of resource utilization for power generation could change drastically and relieve some of the prospective pressure on coal reserves.

The coal reserves of India are impressive and reckoned at over 50,000 million tons. As this estimate included depths of only up to 2,000 feet, there are believed to be additional inferred reserves of 81,000 million tons of coal. However, of this quantity only about 2,800 million tons represent coking coal.[1] The Gondwana Age formations account for most of India's good and high quality coal and are located in the eastern and central parts of the country. The Tertiary age coals, which account for most of India's lignitic coal, are found in parts of Assam, Rajasthan, Punjab and Madras.

The coal reserves of India are unevenly distributed (Figure 4), and help to explain Bombay's dependence on hydro-electric power and Calcutta's utilization of coal from closer fields. This geographical concentration of coal deposits results in coal being a very expensive source of power and fuel for some of the less endowed states with coal prices varying with the distance from the mine pit head.

The amount of coal consumed for power generation has been

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[1]National Council of Applied Economic Research, New Delhi, Domestic Fuels in India (Bombay: Asia Publishing House, 1959), p. 29, hereafter cited as NCAER, 1959.

increased from 2.8 million tons in 1948 to over eight million tons or about fifteen per cent of the coal produced in 1960 (Table 45). Other major consumers of the total coal production are railways and industries.

TABLE 45

COAL CONSUMPTION IN POWER GENERATION AND COAL PRICES IN INDIA

Year	Total Coal Production (Million M tons)	Coal Used for Power Generation (Million M tons)	% of Production Used in Power Generation	Average Price of of Coal Rs. (M ton at pithead)
1948	30.61	2.77	9.0	14.78
1949	32.30	3.06	9.5	14.78
1950	32.82	3.24	9.9	14.22
1951	34.99	3.65	10.4	14.47
1952	36.89	4.00	10.9	14.52
1953	36.56	4.42	12.0	14.47
1954	37.47	4.78	12.8	14.40
1955	38.84	5.25	13.5	14.47
1956	40.07	5.59	13.9	16.31
1957	44.20	6.03	13.7	17.90
1958	46.07	6.59	14.3	18.63
1959	47.68	7.39	15.2	19.22
1960	52.68	8.01	15.2	N.A.
1966	101.0 [a]	15.30	15.2	N.A.
1971	170.0 [a]	25.70	15.1	N.A.

Source: ECAFE, Energy Sources, p. 139.

[a] Includes 4.9 million tons of lignite proposed to be mined in Madras state.

Over three-quarters of India's present coal production comes from the Bengal-Bihar concentration. Coal production has steadily increased from about thirty-one million tons in 1948 to about fifty-three or fifty-four million tons in 1960 as opposed to the planned target of

sixty million tons. As it will be recalled the shortfall between target and achievement caused the public versus private sector to flare-up and the government coal policy was modified for the following plan period.

Other aspects of government coal policy include pressing for amalgamation of small inefficient collieries. There are an estimated 834 separate mines, of which 349 have a monthly production of under 1,000 tons.[1] Amalgamation from the point of view of better mining conditions, conservation and better utilization of railroad facilities seems reasonable; however, mechanization here as in agriculture and elsewhere is always faced with the decision of whether to continue or discontinue labor-intensive methods in view of the unemployment problem. Coal production during the second plan period coupled with inadequate transport served as an obstacle to development.

As the industrial sector grows the amount of coal used for generation of power will probably stabilize and then decrease (Table 45) and the conservation of coal will increase. Reserves of coking coal are not abundant and their use is beginning to be limited to certain applications. Anticipated future increases in the price of coal will eliminate the present short run advantage that thermal stations have over hydro stations. As capital costs between hydro stations and large size thermal stations (Table 43) vary little, the advantage should swing to hydro-electric power in the near future with the magnitude of the swing depending on the location of industries and the quality of power planning, among other factors.[2] The world petroleum situation after 1980 may

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[1]Platt, India, p. 337.

[2]NCAER, January, 1960, p. 108.

create uncertainties in supply. Countries such as India with available indigenous coal may turn to coal hydrogenation on a large scale, especially if foreign exchange problems persist.[1] Production of liquid fuels and petro-chemicals from coal would place further pressure on coal reserves and in turn would increase demand for nuclear energy as a supplement.

Taking into account the extent of coal resources, the hydro-electric potential[2] and the demand through 1975 (Table 46), it is reasonable to conclude that India's sources for power development are ample and should not be a limiting factor in the future push for economic development. After 1975 nuclear power should begin to emerge as an important source of power.

Pakistan's experience in thermal power generation had been at the same time both similar to and different from India's experience. The attempt by both countries to apply domestic energy sources to their thermal power generation has resulted in their utilization of different forms of energy to accomplish a like purpose. The lack of appreciable oil deposits in both nations has created like problems in exploration, the search for import substitutes and the necessity of building refineries on the coast for processing imported crude oil to conserve

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[1] N. L. Gold, Regional Economic Development and Nuclear Power in India (Washington: National Planning Association, 1957), p. xiv.

[2] The utilizable hydro-electric potential is estimated at 184,000 million KWH; aggregate demand for power in 1975 is assessed at 130,000 million KWH; in converting coal into electricity it took 0.785 tons of coal to produce 1,000 KHW of electricity in 1955 and by 1975 this figure should drop to 0.600 tons; figures cited are from NACER, January, 1960, pp. 47, 106.

TABLE 46

PROJECTED DEMAND FOR PRIMARY ENERGY IN INDIA 1960 AND 1975
(000 TCE)

Sector	Net Coal[a] 1960	Net Coal[a] 1975	Electricity 1960	Electricity 1957	Net Petroleum[b] 1960	Net Petroleum[b] 1975	Total Primary 1960	Total Primary 1975
Agriculture and Allied Activities	1,000	4,000	378	1,800	450	2,280	1,828	8,080
Industry								
Metal and Non-metal	16,960	64,130	6,100	31,500	435	3,375	23,495	99,005
Textiles	2,290	3,380	2,310	5,070	342	1,120	4,942	9,570
Rest	4,890	18,450	2,690	13,800	1,560	8,750	9,140	41,000
Total Industry	24,140	85,960	11,100	50,370	2,337	13,245	37,577	149,575
Transport								
Railways[c]	14,040	20,700	840	4,190	137	1,508	15,017	26,398
Automobiles	--	--	--	--	3,150	13,600	3,150	13,600
Aviation	--	--	--	--	280	1,200	280	1,200
Shipping	450	2,500	--	--	100	340	550	2,840
Total Transport	14,490	23,200	840	4,190	3,667	16,648	18,997	44,038
Domestic								
Heat	4,582	37,305	238	1,625	420	1,670	5,240	40,600
Light	--	--	813	2,840	2,573	3,472	3,386	6,312
Total Domestic	4,582	37,305	1,051	4,465	2,993	5,142	8,626	46,912
Public & Commercial Services	600	3,000	1,072	4,110	--	--	1,672	7,110
Miscellaneous & Unaccounted for[d]	1,000	4,000	--	--	250	900	1,250	4,900
Effective Consumption	45,812	157,465	14,441	64,935	9,697	38,215	69,950	260,615

Source: NCAER, January, 1960, pp. 133, 136.

[a]Excluding coal used in electricity generation. [b]Excluding petroleum used in electricity generation. [c]Including coal and petroleum carried by railways. [d]Including construction--. -- Nil or negligible.

foreign exchange.

The oil reserves of Pakistan stand at only twenty million barrels (Table 44). Indigenous petroleum production, which at present is supplying about fourteen per cent of the country's needs, is concentrated in the Potwar Basin in northwestern Punjab. As there is but one refinery in the country, the Attock Oil Company located near the national capital of Rawalpindi, imported refined petroleum products are costing Pakistan Rs. 264 million (U.S. $55.6 million) per annum.[1] This situation should be relieved somewhat by the new Rs. 120 million refinery going up at Karachi which will process 1.5 million tons of imported crude a year and save about Rs. 30 million in foreign exchange a year. A refinery at Chittagong is also being contemplated.

The Pakistani government is encouraging exploration, but at present there are only four foreign rotary rigs drilling in the country.[2] However, the Assam-Arakan Oil Belt area (Figure 4), where chances for success may be more likely, is an extremely difficult area to explore due to the rugged terain, dense forest and wet conditions.

East Pakistan, especially the area west of the Jamuna-Padma River system, is dependent on imported furnace and diesel oil as well as imported Indian coal for most of its thermal power generation. While some lignite deposits do exist in East Pakistan, they are undeveloped (Figure 5). The seams, though exploitable, are largely located under water.

The area east of the Jamuna-Padma has received some relief

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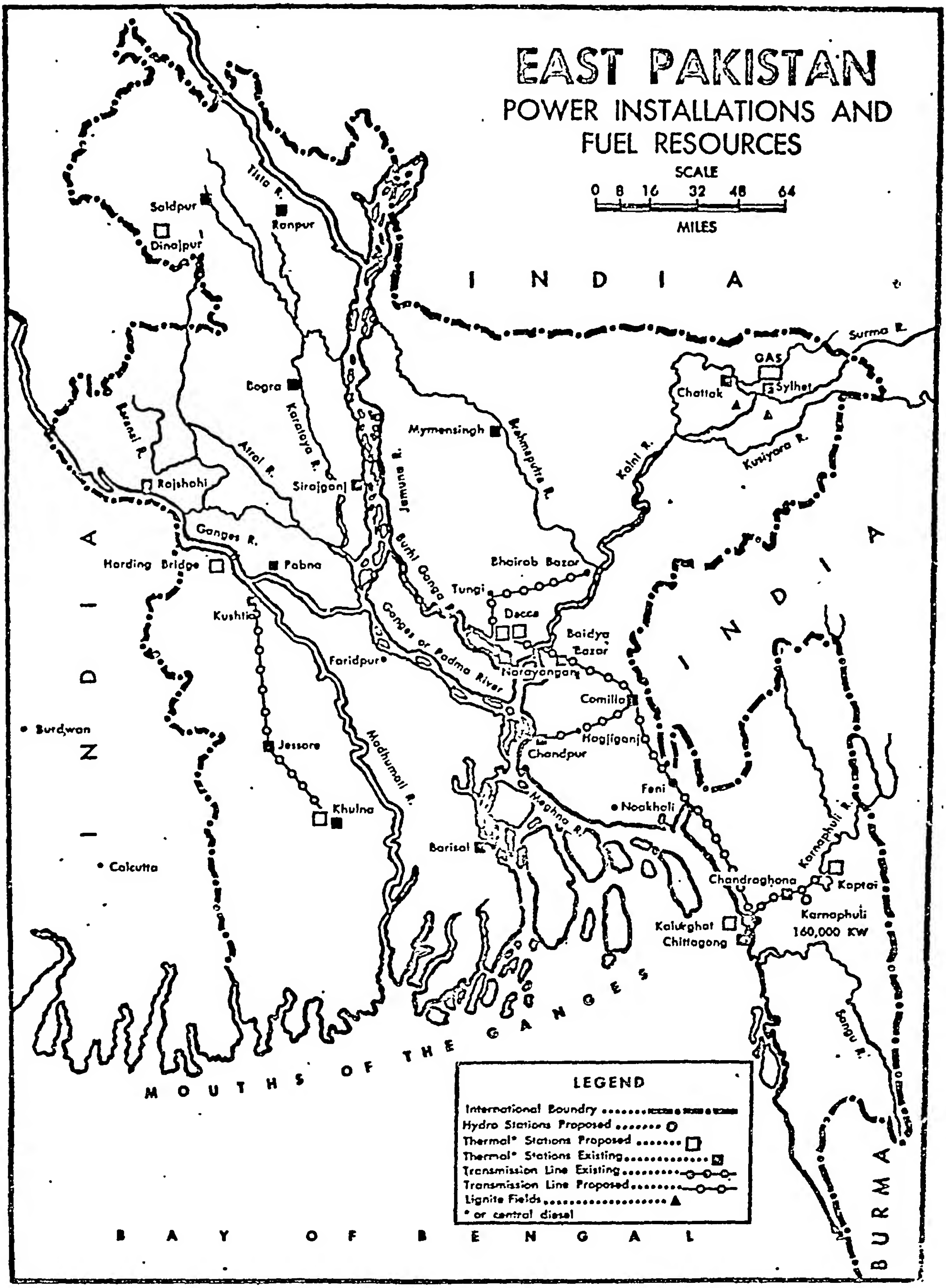
[1] ECAFE, Petroleum Resources, p. 195.

[2] The Oil and Gas Journal (January 27, 1964), p. 122.

Fig. 5.--East Pakistan, Power Installations and Fuel Resources

Source: M. D. Kilbridge, The Prospect of Nuclear Power in Pakistan (Washington: National Planning Association, 1958), p. 20.


EAST PAKISTAN
POWER INSTALLATIONS AND FUEL RESOURCES
SCALE
0 8 16 32 48 64
MILES
INDIA
INDIA
INDIA
BURMA
BAY OF BENGAL
MOUTHS OF THE GANGES
Saidpur
Dinajpur
Tista R.
Ranpur
Bogra
Karatoya R.
Atrai R.
Rajshahi
Sirajganj
Jamuna R.
Mymensingh
Brahmaputra R.
Ganges R.
Harding Bridge
Pabna
Kushtia
Faridpur
Ganges or Padma River
Burhi Ganga R.
Bhairab Bazar
Tungi
Dacca
Baidya Bazar
Narayanganj
Comilla
Hajiganj
Chandpur
Jessore
Khulna
Madhumati R.
Barisal
Meghna R.
Feni
Noakhali
Burdwan
Calcutta
Chattak
GAS
Sylhet
Surma R.
Kusiyara R.
Kalni R.
Chandraghona
Kaptai
Karnaphuli R.
Karnaphuli
160,000 KW
Kalurghat
Chittagong
Sangu R.
LEGEND
International Boundry
Hydro Stations Proposed
Thermal* Stations Proposed
Thermal* Stations Existing
Transmission Line Existing
Transmission Line Proposed
Lignite Fields
* or central diesel

from its power-poor condition by the 1956 discovery of a large natural gas field at Sylhet which has reserves of about 280,000 million cubic feet. Another field was discovered at nearby Chattak with reserves estimated at 20,000 million cubic feet. This natural gas forms the basis for not only thermal power to local industry, which is rapidly converting its present oil burners, but also will become an important factor in enlarging domestic fertilizer production.

Workable coal reserves of West Pakistan are estimated at 165 million tons of which 77 million tons are in the Baluchistan area, 24 million in the Trans-Indus region and the rest in the Salt Range.[1] Most of the coal is of poorer quality, being high in sulfur and ash content rendering it unsuitable for most thermal power stations.

Pakistan consumes about two million tons of coal a year but produces only about thirty per cent of its requirements. It would appear from recent studies[2] that the relative inferiority of Pakistan's coal is not necessarily the main deterrent to increased consumption of domestic coal as is the lack of investment and efficiency of the present mines.

The Pakistan Industrial Development Corporation (PIDC), a public authority which promotes industrial projects that private enterprise has been unable or unwilling to enter into, is helping to reorganize the coal mining industry by consolidation of smaller collieries and expects to

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[1]Andrus, p. 206.

[2]M. D. Kilbridge, The Prospect of Nuclear Power in Pakistan (Washington: National Planning Association, 1958), p. 18. The author reports that the average heating value of Pakistan coal is about 10,000 BTU per pound as compared with 12,000 BTU per pound of delivered Indian coal.

establish four units which will each have a producing capacity of 3,000 tons of coal a day. Briquetting will receive heavy emphasis with the result that greater use of domestic supplies of coal will be made in the future.

Natural gas is a major source of power in West Pakistan where, at Sui, is located one of the world's ten largest known gas fields, with a reserve of five trillion cubic feet (Figure 6). Had it not been for this discovery some five years after independence, West Pakistan's power position would indeed be weak. This resource undoubtedly forms a large basis for increased economic development in this part of Pakistan. Sui gas is replacing formerly imported coal and oil used by industry. Pipelines are being constructed to the north and south as the field lies midway between the industrial south and the agricultural north. The gas will be important to fertilizer and petro-chemical industries and is presently used to some extent for domestic heating. Natural gas is expected to account for a large percentage of the planned increase in thermal generating capacity (Table 41) and helps to explain the planning authorities' statement that, ". . . the new thermal stations included in the Plan are all based on indigenous fuels."[1]

The very rapid utilization of this resource provides another example of the import substitution policy at work. Had the discovery not been made, some of the existing industries might not have evolved. Imports of fuels may have been necessary if development was to take place. In lieu of any substantial investment or important

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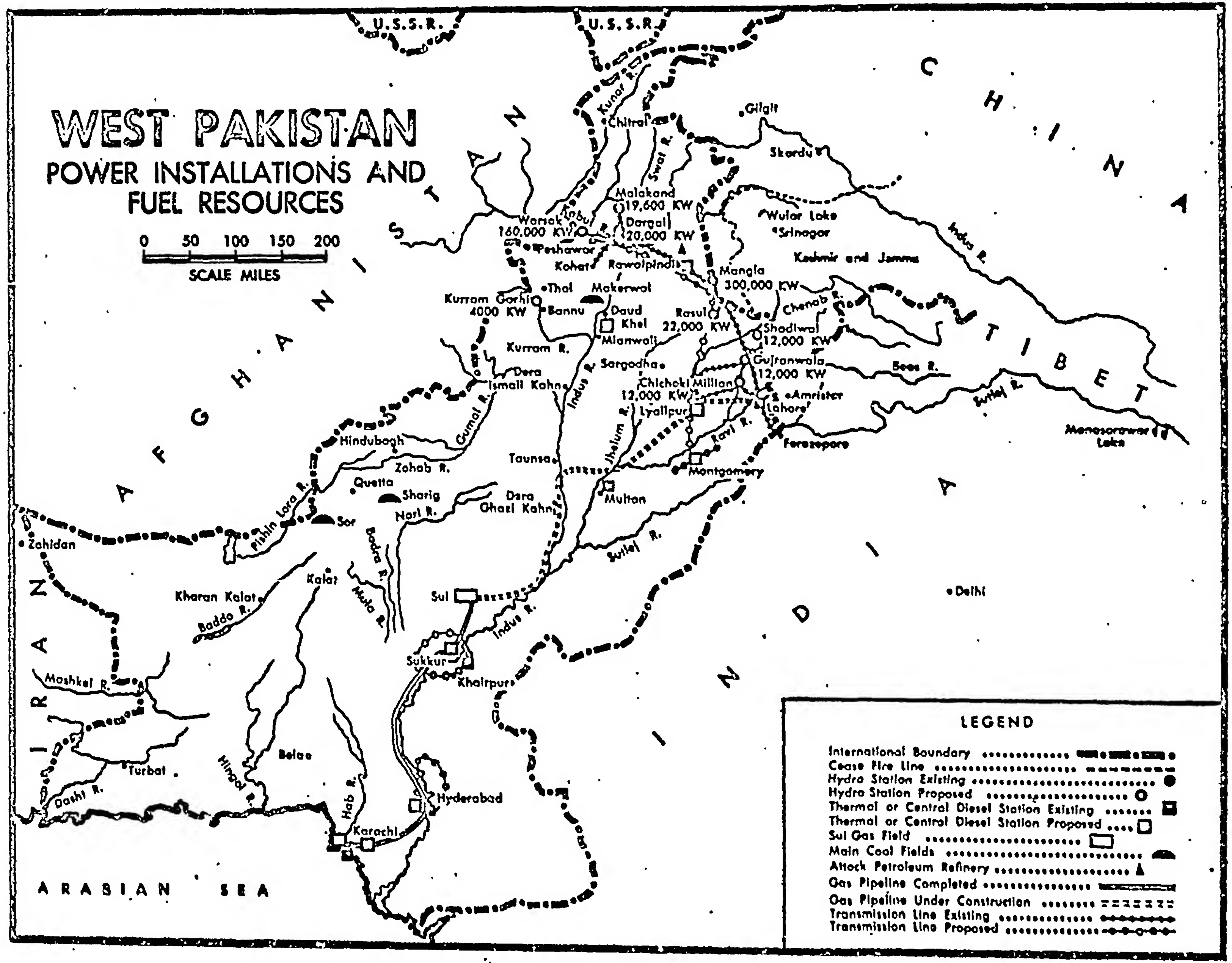
[1]<u>PSFYP</u>, p. 212.

Fig. 6.--West Pakistan, Power Installations and Fuel Resources.

Source: Killbridge, p. 44.


WEST PAKISTAN
POWER INSTALLATIONS AND FUEL RESOURCES
0 50 100 150 200
SCALE MILES
U.S.S.R.
U.S.S.R.
CHINA
TIBET
INDIA
AFGHANISTAN
IRAN
ARABIAN SEA
Gilgit
Skardu
Chitral
Kunar R.
Swat R.
Malakand 19,600 KW
Dargai 20,000 KW
Warsak 160,000 KW
Peshawar
Kohat
Rawalpindi
Wular Lake
Srinagar
Kashmir and Jammu
Indus R.
Mangla 300,000 KW
Chenab R.
Thal
Makerwal
Kurram Garhi 4000 KW
Bannu
Daud Khel
Mianwali
Rasul 22,000 KW
Shadiwal 12,000 KW
Kurram R.
Dera Ismail Kahn
Sargodha
Gujranwala 12,000 KW
Beas R.
Chichoki Millian 12,000 KW
Amritsar
Lahore
Lyallpur
Jhelum R.
Ravi R.
Sutlej R.
Ferozepore
Manasarowar Lake
Hindubagh
Gumal R.
Zohab R.
Taunsa
Montgomery
Quetta
Sharig
Dera Ghazi Kahn
Multan
Pishin Lora R.
Sor
Nari R.
Bodra R.
Zahidan
Kalat
Kharan Kalat
Baddo R.
Mula R.
Sui
Delhi
Sukkur
Khairpur
Moshkel R.
Turbat
Dashi R.
Hingol R.
Belaa
Hab R.
Hyderabad
Karachi
LEGEND
International Boundary
Cease Fire Line
Hydro Station Existing
Hydro Station Proposed
Thermal or Central Diesel Station Existing
Thermal or Central Diesel Station Proposed
Sui Gas Field
Main Coal Fields
Attock Petroleum Refinery
Gas Pipeline Completed
Gas Pipeline Under Construction
Transmission Line Existing
Transmission Line Proposed

discoveries of oil or coal, Pakistan's future power development will be based largely on gas and water sources as opposed to India's coal and water sources.

There will, of course, be areas that hydro power and gas based power will not be able to reach. It is in these areas where application of nuclear energy may prove feasible as the costs of producing such power decreases and demand for power increases.

While nuclear power is not currently competitive with other power sources, its future possibilities as an alternate energy source are quite important. The more remote parts of Pakistan, which are presently being served by diesel oil, may in the future find small nuclear power plants in the 2,000 kw to 5,000 kw range competitive.[1]

However, for the next fifteen to twenty years it does not appear that nuclear power will play in important role in Pakistan.

With a view to the future, Pakistan intends to establish a nuclear accelerator of ten to fifteen mev in East Pakistan and an Institute of Nuclear Research and Reactor Technology equipped with a swimming pool research reactor of one to fifteen mev. Also included in the Rs. 46.5 million to be spent is the provision for exploration for radio-active minerals and the training of personnel to man the future atomic energy program. The latter consideration perhaps constitutes the single most important limiting factor in future atomic power development.

India's progress in this power field has gone a bit further than that of Pakistan. Having the advantage of indigenous natural resources

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[1]Kilbridge, pp. 55-56.

on which to build future nuclear power development, India will start to feed nuclear based electricity into existing power grids in the near future. This electricity will be a by-product of an initially costly first stage development of India's atomic energy program.

The country's long-run nuclear power program may be based on a thorium fuel cycle rather than on uranium as has been the case in the past of most other countries' atomic power development programs. The reason for this lies in the fact that India has one of the largest known deposits of thorium in the world and desires to be self-sufficient in its future atomic power development. India is expanding research into thorium applications as there has been a dearth of such research elsewhere in the world. This activity seems to illustrate the point that a large abundance of a given natural resource may stimulate the evolution of a technology designed to expand its use.

Reserves are estimated at 500,000 tons of ore containing nine per cent thorium and are found largely in the monazite beach sands of Kerala, Madras and Orissa while on the other hand, known uranium reserves are only about 30,000 tons found also in monazite sands as well as the Bihar copper area and Aravelli Range in Rajathan.[1] The total known reserves of Indian uranium and thorium according to Dr. H. J. Bhabha, are equivalent to more than fifteen times the reserves of coal.[2]

As one ton of uranium is said to have the potentialities of producing as much electricity as 10,000 tons of coal, it follows that a great burden could be lifted from the transportation system. While

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[1]ECAFE, Energy Sources, p. 141.

[2]Gold, p. 121.

nuclear stations are not as yet competitive with other types of power stations, the necessity of training technicians to administer and operate the nuclear reactors of the future has influenced India to begin the first stage of her three stage program.[1]

Stage 1--Uranium fueled reactors to generate electricity and produce plutonium.

Stage 2--Reactors with plutonium using thorium as blanket material to generate electricity and produce U-233.

Stage 3--Thorium and U233 used in breeder reactors to produce electricity and more U233 than used initially.

Consequently the future calls for construction of a 380 mw plant based on enriched uranium fuel to be located at Tarapur, Maharashtra, with United States financial and technical assistance.[2] India's first uranium ore processing plant is being established at Juduguda, Bihar, at a cost of Rs. 49 crores and expects to be producing 1,000 tpd of ore by 1964. The function of this plant is to supply fuel for the Tarapur power plant.[3]

Before turning to the other sources of inanimate energy, India and Pakistan's progress toward electrification of towns and villages should be noted for this is one area in which the impact of economic development becomes more obvious to many persons in both countries who may feel removed from the present stream of development activity. Indian electrified towns and villages are planned to increase from the 9,400

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[1]ECAFE, Energy Sources, p. 142.

[2]"GE gets Contract for Indian Plant thru AID Loan," International Commerce (July 15, 1963), p. 14.

[3]Engineering and Mining Journal (August, 1963), p. 187.

which were electrified at the end of the first plan to about 46,000 by the end of the third plan. In Pakistan, currently all fifty-six towns with a population of over 25,000 are electrified, but only sixty-four of the 186 towns of populations from 5,000 to 25,000 have electricity. The future calls for an outlay of Rs. 250 million with the expectation that fifty additional towns will be electrified and the number of electrified villages will increase to 2,370 out of the existing 100,000 villages. The slow progress in electrifying the rural areas may be expected to change to some degree, especially in India, as the location pattern of thermal coal based stations changes.

The policy in India of locating coal based power stations close to electricity consuming urban areas is slowly changing to one of locating near pit heads and transmitting the power to towns and villages within a 200 mile range.[1] Of the many factors involved the major consideration seems to be the conservation of metallurgical coal for the expanding iron and steel industry as well as the conservation of higher quality coal for railway consumption. Since the more inferior grades of coal have now been assigned to thermal generation wherever possible, it becomes cheaper inmany instances to transmit the power rather than to haul coal over the particular distance. This policy should result in greater dispersal of industries, bring electricity to more villages and assist in greater utilization of electricity by agriculture and cottage industries.

While this study has gone into some detail concerning the sources of power development in Pakistan and India due to their infra-

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[1]ECAFE, Energy Sources, p. 140.

structure importance, it may be worthwhile to note that electricity's contribution to the inanimate energy consumption pattern is still relatively small. For instance, of the inanimate energy consumed in India in 1960 electricity accounted for 8.2 per cent of the total used. (Tabel 47.) In turn, inanimate sources of power were estimated to provide only one-third of the total power expended in both countries with the rest accounted for by man and draft animals.[1]

Other Sources of Inanimate Energy

As is evident from the preceding table and other studies there is no firm agreement on how much cow dung, wood and vegetal fuel is consumed except that the amount is substantial. In preparing the third plan, Indian planners estimated that non-commercial sources of energy accounted for 60.6 per cent of the total inanimate energy consumed in 1960-61 broken down as follows: cattle dung 27.9 per cent, fuel wood 21.2 per cent and agricultural waste 11.5 per cent.[2] Of the annually available 1,200 million tons (wet weight) of cattle dung, 400 million tons were burned as fuel, 215 million tons were used as manure with the balance being lost or wasted. Wood used as fuel for domestic and industrial purposes amounted to sixty million tons a year. Translated into coal equivalent terms the fuelwood amount to 35 millions tons and dung to 46 million tons for a total of 81 million tons, a figure somewhat below those cited in Table 47. While figures for Pakistan were

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[1]Office of International Trade, U.S. Department of Commerce, Investment in India (Washington: U.S. Government Printing Office, 1953), p. 73 as cited in Platt, India, p. 327.

[2]ITFYP, p. 194.

TABLE 47

CONSUMPTION OF INANIMATE ENERGY IN INDIA--SUMMARY OF DIFFERENT ESTIMATES

Item	1947[a]	1952[b]	1952[c]	1953[d]	1954[e]	1955[f]	1955[g]	1960
			(million metric tons coal equivalent)					
A. Commercial								
Coal	30.07	35.56	33.32	33.73	28.79	36.10	37.19	55.46
Petroleum Products	3.10	6.10	4.77	6.10	5.21	6.26	5.49	10.25
Hydro-electricity	0.26	1.02	0.38	0.41	4.57	3.10	2.13	5.52
Total Commercial	33.43	42.68	38.47	40.24	38.57	45.46	44.81	71.23
B. Non-Commercial								
Cattle Dung	103.6	40.64		140.72	91.44			
Wood, Vegetal Fuels	4.7	43.70	83.62	3.25	9.86	95.23	101.60	100.00
Total Non-Commercial	108.3	84.34	83.62	143.97	101.30	95.23	101.60	100.00
Total	141.73	127.02	122.09	184.21	139.87	140.69	146.41	171.23
Total energy used as electricity	4.27	6.44	6.44	6.88	7.49	8.32	8.32	14.01
			(per cent of aggregate energy consumption)					
A. Commercial								
Coal	21.0	28.0	27.3	18.3	20.6	25.7	25.4	32.4
Petroleum Products	2.2	4.8	3.9	3.3	3.6	4.4	3.7	5.9
Hydro-electricity	0.2	0.8	0.3	0.2	3.3	2.2	1.5	3.3
Total Commercial	23.6	33.6	31.5	21.8	27.6	32.3	30.6	41.6
B. Non-commercial								
Cattle Dung	73.1	32.0		76.4	65.4			
Wood, Vegetal Fuels	3.3	34.3	68.5	1.8	7.0	67.7	69.4	58.4
Total Non-Commercial	76.4	66.4	68.5	78.2	72.4	67.7	69.4	58.4
Total	100	100	100	100	100	100	100	100
Total used as electricity	3.0	5.0	5.2	3.7	5.3	5.9	5.7	8.2

Source: ECAFE, Energy Sources, p. 138.

[a]C. C. Putnam estimate; [b]M. N. Saha estimate; [c]International Conference on Peaceful Uses of Atomic Energy estimate; [d]H. J. Bhabha estimate; [e]Burmah-Shell Oil Company estimate; [f]NCAER estimate; [g]Committee on Requirements and Utilization of Coal.

not available for comparison widespread burning of dung cakes for fuel continues in lieu of other sources of fuel.

In any case, the amount of dung used as fuel is considerable. The economic implications to agriculture and the food problem are evident since one ton of dung apparently contains about 0.3 per cent nitrogen. The 400 million tons burned in India represents 1,200,000 tons of nitrogen. According to some authorities, "Agriculture evidence indicates that the treatment of farm yard manure gives a response of five to fifteen pounds per pound of nitrogen depending upon the nature of soil, watering and other factors."[1] In assuming an average of ten pounds, the 1,200,000 tons of nitrogen would yield twelve million tons of food grains.

The recommendation that it is preferable that cattle dung be used as manure has, of course, been made on numerous occasions. The reason for the widespread use of dung as fuel in rural areas is apparently not due to any lack of knowledge concerning its manuring value but rather is due to the shortage of firewood. However, due to the long duration of this practice, any widespread substitution of other fuel materials for dung would have to be accompanied by either mass persuasion of the women villagers who have become accustomed to slow low temperature combustion in their manner of food preparation or a readily available fuel burner providing similar results.

This problem would not apply to the areas where firewood is abundant, and is used as the main source of heating. Indian studies have revealed that in areas with readily available wood, dung is used

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[1] NCAER, 1959, p. 18.

primarily as a manure. Even though sizeable amounts of dung are burned as fuel, firewood continues to be the main source of domestic heat in both rural and urban India (Table. 48).

TABLE 48

SOURCES OF INDIAN DOMESTIC HEAT CONSUMPTION 1956
(million tons of coal equivalent)

Fuel	Urban	Rural	Total
Coal	2.0	--	2.0
Electricity	0.2	--	0.2
Kerosene	0.3	--	0.3
Dung	4.0	35.0	39.0
Firewood	13.5	42.0	55.5
Total	20.0	77.0	97.0

Source: NCAER, 1959, p. 15.

The present pattern of burning dung for fuel will probably continue until such time as the problem is tackled on a local level through afforestation and land management programs. Dr. B. P. Pal of the Indian Agricultural Institute believes it should be possible to eliminate the use of dung cakes and meet the demands of the villages through fuelwood by:[1]

1. Assigning fifty acres on one side of a village to tree farming. Such a plan would make fuel-wood available from the seventh year of planting.

2. Transporting wood from other forests within thirty miles of [illegible].

The capital and running expenses in such a scheme would be minute when compared to what would be necessary should coal be used

[1] Ibid., p. 21.

as the substitute. The enlarged coal production might entail capital of RS. 125 to 150 crores; a sixty per cent increase in current rail capacity would be needed and present rail transport capacity would have to be at least doubled to solve the distribution problem. It is presently estimated that there will be a 100 million ton shortage of fuel wood in India by 1975.

Summary and Conclusions

A basic requirement of economic development is a nation's infrastructure, and power and fuels form vital ingredients of this infrastructure. Improvements in power and fuels provide added vitality to agriculture, a foundation for industrialization and improve effectiveness in other sectors.

Applying the per capita energy consumption yardstick to India and Pakistan reveals India's 140 kilograms consumption in terms of coal equivalent to be more than twice that of Pakistan. With the exception of power-poor East Pakistan, the demand for power by most areas of the subcontinent is being met by the present capacity. Power crises, however, occur when facilities break down. Present consumption levels are still quite low when compared to more economically advanced nations where per capita consumption of over 2,000 kilograms is common.

While electric power is not the major form of energy used on the subcontinent today, having provided only 8.2 per cent of the total inanimate energy consumed in India in 1960, its future development will be of great importance to both countries. Because of the multiplicity

of its application, this advanced type of energy has, in the past, contributed importantly to the progress of other countries.

Future power development will be affected by the nature of the demands as well as the capabilities of the two nations in providing the natural resources needed to meet the demands. Past consumption has come primarily from industry and urban centers and this pattern of consumption is expected to continue. Increased rural demand will stem from developments in water management and village electrification.

The role of natural resources in the progress of this sector is straightforward. The different power installations largely depend on the available resource bases. The kinds, amounts and qualities of these natural resources help to influence the direction of power expansion as well as the direction of economic development in general. Water, natural gas, coal, lignite, oil and atomic materials are the main resources available on the subcontinent for power development.

Partitioning of the subcontinent provided India a wide advantage over Pakistan in the availability of resource bases for power growth. This advantage is large not only in the quantity of resources but their quality and application capabilities.

The coal reserves of India are gigantic when compared with those of Pakistan. The meager coal endowment of Pakistan is also of poorer quality and cannot readily be adapted to thermal power generation. The reserves of lignite that exist in East Pakistan are under water and have not been utilized while the 2,500 million tons found in India have begun to be exploited and are forming the basis of regional economic development in the southern part of the country.

The natural gas reserves of India are minimal while Pakistan possesses 5 trillion cubic feet in West Pakistan and 380,000 million cubic feet in East Pakistan. In light of the paucity of coal and other power fuels and resources in Pakistan, it is fortunate that these large pools of natural gas exist. However, while natural gas may be readily substituted for coal in power production, it does not possess the wide range of application that coal enjoys.

The advantage that India holds over Pakistan in power resources also extends to water resources. India has an estimated potential of 41 million kw as compared with Pakistan's 10.3 million kw potential. All but one million kw of Pakistan's potential is in West Pakistan where, unfortunately, a number of the best sites and areas of broadest potential are located in distant mountain areas and away from centers of population.

The oil potential of the subcontinent is unknown at present. The petroleum reserves of India are estimated at 375 million barrels while the reserves of Pakistan stand at only 20 million barrels. Neither of these reserve pools begins to answer the requirements of the two nations and both have resorted to building seacoast refineries to process imported crude petroleum. Difficult terrain conditions and lack of attractive incentives to attract foreign exploration have left the potential of the Assam-Arakan Oil Belt unknown. While both countries would benefit from such knowledge, it would especially behoove Pakistan to know its oil potential in light of its limited resources base.

India's power potential, consisting of massive coal reserves, a hydro potential which will be twelve per cent realized by 1966 and one of the largest throium deposits in the world, is a much stronger

resource base than Pakistan's large pools of natural gas and hydro potential which will be only 3.5 per cent utilized in 1965. Even though both countries have foreign exchange problems, India has the opportunity of picking and choosing which local resources to develop while Pakistan with its fewer resources is more limited.

As coal consumption increases in India because of increased industry consumption and coal prices rise as anticipated, the capital cost advantages will swing from thermal stations to hydro-electric stations in some areas of the country. If domestic petroleum reserves do not change and the foreign supply becomes uncertain, India may use its coal reserves to produce liquid fuels and petro-chemicals. Such a situation would probably result in the expansion of nuclear energy as a source for power.

Assuming that the coal and petroleum situation does not change in Pakistan, natural gas will be increasingly substituted for these resources. The substitution will be aimed at relieving imports of these resources in the power and fuel applications in industry. How much can be done to take pressure off household consumption of dung and wood by use of gas remains to be seen.

In discussing the substitution of one resource for another, writers generally take the favorable view that the process demonstrates a country's ability to be flexible and ingenious in solving a shortage problem and that this is evidence that no single natural resource is particularly important. The substitution of cattle dung for fuelwood on the subcontinent has not proved to be a desirable solution. Failure to attend to the fuel needs in each country has resulted in robbing its

agricultural sector of readily available fertilizer with which to increase foodgrain yields. A rough estimate places the loss in India at about 12 million tons of foodgrains a year. Thus, substitution of one natural resource for another may at times result in merely shifting pressures from one area to another without resolving the original problem.

The fuelwood problem needs immediate attention in both countries. As the demand is expected to keep increasing the best course of action among the alternatives appears to be simply growing more trees. To increase the amount of dung burned would be wasteful and to attempt to substitute coal or other fuel for wood may not be economically feasible at present. Village tree farming would require setting aside a certain amoung of land for this purpose in each village and persuading the villagers to manage it on a joint basis. The community development and village aid agencies of both countries probably would be the vehicle for implementation of such a broad range project.

The natural resources India has available for power are ample to meet forecasted demand and should not be a limiting factor in future economic development. In lieu of future discoveries of additional resources, the success of Pakistan in meeting future power and fuel needs will largely hinge on the ability of that country to substitute gas and water wherever possible in applications now using imported materials and local resources which are in short supply. In may also be possible to pay for needed imports by the export of natural gas in liquid form.

CHAPTER VI

MINERALS, AGRICULTURAL PRODUCTS AND INDUSTRY

The purpose of this chapter is to examine the part played by minerals and agricultural products in the economic development of Pakistan and India and especially as they are related to the industrial sector of each country. Such natural resources influence the direction of a country's economic development with this influence perhaps best demonstrated by the composition of industry that evolves within the nation. Even more direct is the role played by production surpluses whereby exports earn foreign exchange and in turn enable import of needed capital goods for the broad program of development.

Both nations are following an import substitution policy wherever possible in order to conserve foreign exchange. They are endeavoring to establish local industry to produce many of the requirements that have had to be imported. Pakistan has stated flatly, "New capacity is to be established where it demonstrably and substantially earns or saves foreign exchange or is based in the main on the use of indigenous raw materials."[1]

An important ingredient of such a policy is the availability of indigenous raw materials because this factor will affect the path that these endeavors can take. It follows that the greater the variety,

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[1] PSFYP, p. 5.

extent and quality of available natural resources the greater the flexibility a country has in applying an import-substitution and foreign exchange conservation policy. It is but a short step to the conclusion that, other factors being equal, a greater abundance of natural resources puts a country in a more favorable position to achieve sustained growth than a country without such an abundance.

General writings which have placed less emphasis on the role of natural resources to development have cited countries that have an abundance of natural resources but are not developed and Japan's experience as evidence that an abundance of natural resources is not required to achieve sustained growth. The problem with such evidence is that it is merely describing a set of circumstances which have existed within two different countries. It does not materially add to our knowledge of the importance of natural resources to development aside from pointing out that natural resources by themselves will not cause or assure economic development as in the case of the well endowed underdeveloped country and that an abundance of natural resources need not be a pre-condition to economic advancement as in the case of Japan.

To single out the natural resource factor in these two instances and by implication render them less important is not meaningful especially if economic growth is viewed in its entirety. It is becoming widely accepted that rather than any single factor being responsible for economic growth there are a group of factors involved of which the natural resource factor is but one.

The number of countries with meager natural resources at

their command that have matured economically is not large. In the long run these instances may become characterized as exceptions. This kind of achievement is remarkable in light of the experiences of other developed countries and the fact that there are a host of nations existing today which are well endowed with natural resources but which have not developed. The fact that a very few nations have been able to take advantage of a fortuitous set of circumstances at a particular time in their history seems insufficient reason to assume that the contribution of natural resources to development will be minor. It seems more reasonable to assume that if the other factors involved in economic growth are favorable, the task will be easier for a country which has an abundance of natural resources than for one which does not.

Found in the mineral and agricultural bases of India and Pakistan are the raw materials upon which depend the mining and some harvesting activities of these two sectors as well as their related processing industries. The linkage is further extended because the by-products of these processing activities in turn provide the basis for other activities in the industrial sectors of both economies. Such a treatment of a country's industrialization experience does not imply that natural resources are a causative factor in the establishment of a certain industry. If capital and the other necessary factors exist, the factor of raw materials, if in short supply, can perhaps be imported. However, in the case of India and Pakistan where the factor of foreign exchange is a problem and import policies are biased in the direction of development imports such as various forms

of capital equipment, the availability of domestic natural resources helps to determine what will be produced at home.

Pakistan, following independence, found itself low in industrial capacity despite the existence of sizeable raw material resources in jute, cotton, bamboo, hides and skins, and oilseeds. Aside from some cotton textile mills, cement and sugar plants and a single electric steel furnace and shoe factory, most of the raw material and food processing units were small.[1] Reasons for this situation go back into the past where, in undivided India, industry had tended to cluster around port cities and the natural resources of coal, iron and fuels.[2] No sizeable Muslim entrepreneurial class was to emerge until after independence. Areas that once served as suppliers of raw materials such as East Bengal with its jute and Punjab with its cotton now became Pakistan territory. Prior to independence different regions of the subcontinent tended to complement each other, but following partition both nations embarked on courses that would remove dependence upon the other's products and raw materials.

Cotton, which is grown mainly on the irrigated lands in West Pakistan, and jute, which is mostly grown in East Pakistan, represent this country's main cash crops. They support the two major industries, and provide over fifty-two per cent of the total export earnings. Since independence, Pakistan has succeeded in moving steadily from a position of raw material exporter of jute and cotton to one also of textile manufacturer for both domestic and foreign consumption.

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[1]Andrus, p. 166

[2]*Ibid.*, p. 167

The present status of Pakistan's textile industry and the part it plays in the current economy has been detailed previously.

While Pakistan can be proud of the progress achieved over a very short time in textiles, continued heavy dependence on raw jute and cotton as well as manufactures from these materials for the purpose of export earnings places the country in a vulnerable position. Many nations, which have the requisite climatic conditions, strive to become relatively self-sufficient in textiles and hope to develop an export trade in this field. Hence, competition in world markets is strong with many nations resorting to tariffs to protect their own industries.

A natural monopoly in jute had existed on the subcontinent for many decades; however, this picture is also changing. India turned to raw jute production to remove the dependence Calcutta had on Pakistan jute. Pakistan, in turn, built up a processing capacity from no jute looms at independence to a current 9,000 looms. This was largely accomplished through the equal effort of private and public enterprise via the PIDC. At present India accounts for about thirty-three per cent and Pakistan about forty-seven per cent of the world's total raw jute production with India using about 1.7 million acres of land and Pakistan 1.5 million acres.[1] Since eighty per cent of India's sown area (Table 34) and eighty-five per cent of Pakistan's cultivated land (Table 35) is turned over to foodgrain production and the food enigma continues, it is unlikely that jute, cotton and other cash crops can expect to use more land for expansion but rather will

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[1]"Jute Industry in Recent Years," The United Commercial Bank Review (October, 1960), p. 6.

have to concentrate on increasing their yields per acre.

India was more active than Pakistan in production of jute manufactures (Table 49) as the latter had considerably less manufacturing capacity and exported most of the jute crop in raw form. India's share of the total world jute goods market was about eighty per cent.

The rising prices of jute, the emergence of substitutes and different methods of handling bulk goods could hamper future export levels of jute unless both nations undertake measures to cope with the competition. Paper bags, for example, are replacing jute bags in the United States in the movement of various goods ranging from cement and fertilizers to flour and chemicals. Grain is being increasingly exported in bulk both within countries and between countries. Kenafe, another vegetable fiber, is almost interchangeable with jute[1] and is being grown in a number of countries. Man made fibers also can be expected to provide future competition. While jute has benefitted in the past from subsidies, controlled prices, technical aid, and tariff walls, more attention is needed to make jute competitive not only in price but also in terms of application. Expanded research into the farming aspects of jute as well as into new possible uses coupled with aggressive international marketing could conceivably assure present position maintenance in the world market before the substitutes take hold.

The significance of these cash crops and other agricultural materials in relation to other exports is reflected in Tables 50 and 51. The composition of the export trade of both countries is overwhelmingly

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[1]"Jute Industry in Recent Years," p. 6.

TABLE 49

PRODUCTION AND EXPORT OF JUTE GOODS IN INDIA AND PAKISTAN

Year	India				Pakistan			
	Hessian (000 tons)		Lacking (000 tons)		Hessian (000 tons)		Lacking (000 tons)	
	Production	Export	Production	Export	Production	Export	Production	Export
1955-56	403.0	395.9	622.9	414.2	30.2	24.2	94.5	60.7
1956-57	428.3	422.1	526.8	392.3	35.7	27.8	105.3	53.4
1957-58	391.7	384.3	596.7	386.6	39.8	33.7	112.5	73.8
1958-59	446.4	452.2	509.6	327.8	51.8	42.3	140.8	91.2

Source: Annual Summary of Jute and Gunny Statistics, 1949--Indian Jute Mills Association as cited in "Jute Industry in Recent Years," p. 8.

TABLE 50

PAKISTAN FOREIGN EXCHANGE EARNINGS DURING FIRST PLAN AND FORECAST
(million rupees)

Item	Total 1955-60	Annual Average First Plan	Total Second Plan	Annual Average Second Plan
Raw Jute	4,212	843	4,000	800
Jute Manufacturers	685	137	1,335	267
Raw Cotton and Manufacture	1,938	388	1,900	380
Hides and Skins	251	50	210	42
Wool	417	84	400	80
Tea	155	31	245	49
Miscellaneous Exports	795	159	1,440	288
Invisible Receipts	1,098	220	1,070	214
	9,554	1,912	10,600	2,120

Source: PSFYP, pp. 83 and 91.

TABLE 51

INDIAN PATTERN OF EXPORTS 1951-60
(Rs. Crores)

Item	1950-51	1955-56	1959-60
1. Agricultural commodities and related manufactures	496.5	489.3	473.6
(Cotton and Jute manufactures included in Item 1)	250.5	181.7	180.5
2. Other manufactures	58.4	61.0	105.0
New manufactured products (included in Item 2)	8.9	8.6	65.0
3. Minerals	23.4	34.4	53.0
TOTAL	578.3	584.7	631.6

Source: ITFYP., p. 135.

in favor of agriculturally associated products, raw materials and mineral resources with manufactured goods accounting for the remaining small portion of the total.

The forest resources of East Pakistan, though admittedly small in terms of the fuel and industrial wood product requirements of Pakistan, have nevertheless assisted in making the country self-sufficient in paper with capacity going from zero to about 43,000 tons. The soft woods of the Sunderbuns provide the raw material base for newsprint production. As present domestic demand has been met, future annual exports of newsprint as well as mechanical paper should run roughly 10,000 tons each. Other paper industries in both of the provinces utilize grasses, harvested grain straw and bamboo in manufacturing paperboard, strawboard and hardboard. Some of these products have the capability of being substituted for wood product applications.

India is not self-sufficient in paper and newsprint although the present capacity stands at 400,000 tons. Aims to double the paper capacity and increase newsprint five-fold will result in a shortage of bamboo and a shift to bagasse as an alternative. In turn the sugar mills will now have to find an alternative fuel for bagasse in their production.[1]

Tea also earns foreign exchange for both countries and has been India's leading export earner. Any expansion of this commodity into export channels would have to be accompanied by measures designed to stimulate more tea drinking where present demand is small. At present India's tea production, aside from home consumption, is closely

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[1]<u>TTFYP</u>, p. 489.

aligned with demand for tea in the United Kingdom where the per capita consumption is over ten pounds.[1] As subcontinent tea is not listed among the top quality flavor teas and the chances of improving the quality are not good due to the climate's influence on the flavor, the possibilities for any large scale increase in tea exports appear limited.

Hides and skins which also are exported will probably diminish in standing in the future due to higher internal demand for these products. Quality is also a problem in this field for both nations and the future exports may have to take the form of specialized leather goods.

Tobacco production is more prominent in India than in Pakistan and the former ranks third largest in world production of this commodity. However, Indian tobacco surplus has amounted to only 28,000 tons in 1960-61.[2] Pakistan, while proud of its new cigarette industry which started from no capacity at partition and now annually produces about 9,000 million cigarettes, has had to import tobacco. Foreign exchange problems have stimulated research to develop a local source of tobacco to replace the presently imported bidi leaves.

Coffee is an influential commodity in the economy of South India. This commodity supports such satellite activities as curing, grinding, roasting and packaging and its annual production is valued

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[1]"India's Foreign Trade," The United Commercial Bank Review (January, 1960), p. 14.

[2]"India's Agricultural Revolution," The United Commercial Bank Review (October, 1962), p. 2.

at about Rs. 10 crores.[1] The country consumes over one-half of its production, but its production is not significant, 34,000 tons in 1955-56, when viewed in terms of world consumption which amounted to 2.2 million tons in the same year. As the coffee exports go mainly to countries of the European Economic Community, competition can be expected to increase from African nations which have preferred entrance into this market.

Sugar does not have much weight in India's exports as the country has not been able to maintain a steady balance of self-sufficiency in this commodity. Pakistan's production has not met internal demand even though the country is not restricted climatically. It is assumed that consumption will be restricted as imports of sugar have not been provided for in the current plan period. Despite the lack of contribution to exports the sugar industry ranks prominently among the cash crops of both countries (Tables 16 and 22).

Ethyl alcohol, a byproduct of the cane sugar industry, and benzene, a byproduct of coal coking operations in steel mill activities, provide India with an abundant supply of raw materials needed in the production of synthetic rubber.[2] Until recently most of the rubber production has been from natural rubber. India's domestic output, some 24,000 tons, is not sufficient to meet internal demand and the productivity of the small rubber growers is quite low. While the rubber plantations' yields per acre compare favorably with those of

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[1]"Plantation Industry in India: Coffee," <u>United Commercial Bank Review</u> (April, 1960), p. 6.

[2]"Plantation Industry in India: Rubber," <u>United Commercial Bank Review</u> (July, 1960), p. 8.

Ceylon, India's rapidly increasing demand has forced the imports of raw rubber. These various factors have contributed to make the production of synthetic rubber competitive with natural rubber. Domestically produced synthetic rubber can be expected to meet about one-half of India's total demand of 100,000 tons of rubber in 1965-66.

Pakistan is presently self-sufficient in bicycle tires and tubes. As natural rubber can be grown in East Pakistan and natural gas discoveries now permit production of synthetic rubber, the country has to decide upon a course of action to follow in the future toward rubber product self-sufficiency and elimination of rubber imports from Malaya.

It has been said that the distribution of natural resources over the globe does not recognize political boundaries. This is certainly true of India and Pakistan where the differences in resource endowment are reflected in their mineral based industries.

As is the case with most nations of the world, neither India nor Pakistan is completely self-sufficient in minerals. They are well supplied in some minerals and wholly deficient in others. The number of different minerals available, their physical quantities and the content of their quality are of significance for their presence or absence exerts an influence on the economic development of the country.

Reference has been made in this study and will be made in the case of minerals as to the adequacy of different natural resources and whether they are ample or deficient. The adequacy of any given natural resource is, of course, related to the short and long term demand for that particular resource and must be viewed as a factor of production

of a desired product. As W. B. Reddaway points out, the population in India, and the same may be said to a lesser degree of Pakistan, is of such a size that "it means that the range of industries which might be introduced is very much larger than in many underdeveloped countries, because there is an adequate potential market for almost anything, at least as one looks forward in time when income per head will have been somewhat raised."[1] Both countries are making a constant effort to raise their incomes and are forced to conserve foreign exchange for imports that are essential but cannot be met through domestic production. Import substitution focuses the emphasis on indigenous natural resources and hence, availability becomes very significant.

Speaking very basically, a natural resource must first exist to play a role. The nation must know of its existence, recognize its utility, decide whether it is economically feasible to utilize it and finally be capable of applying whatever technology is necessary to enter it into the production process. Thus, consideration of the adequacy of natural resources should include, wherever possible, not only the demand for them but also their physical extent, variety, quality and accessibility characteristics.

"While we ought not to decide that industrialization is tantamount to economic development . . ."[2] this is the desired path of both India and Pakistan. Neither country has acquired a detailed knowledge of its natural resource pattern and is presently continuing

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[1] W. B. Reddaway, The Development of the Indian Economy (Homewood: Richard D. Irwin, Inc., 1962), p. 19.

[2] Higgins, p. 7.

with the task of mapping, surveying and exploration to determine its status. From the information presently available, partition resulted in India faring much better than Pakistan. In terms of minerals India has a greater diversity, a greater quantity and, in some cases, less demanding accessibility problems than Pakistan. In referring back to Mr. Reddaway's statement above and examining it from the point of view of available indigenous minerals, there is little doubt that India presently has a potentially wider range of industries than Pakistan.

Aside from the minerals already discussed as they applied to power development, fertilizer production and the like, Pakistan's remaining stock of minerals does not provide a base from which to launch its desired industrial diversification. In the examination of most underdeveloped countries' industrial sector the question of feasibility of an iron and steel industry usually occurs. Some observers believe that many underdeveloped nations view this industry much in the same manner as a public utility[1] and others point out the high backward and forward linkage characteristics of such an industry.[2] Pakistan believes the country's economic maturity is measured by its basic metal and resultant metal products industries and that this industry support of the creation of heavy engineering industries which supports other industry segments and provide the foundation for future development.[3] India's

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[1]F. A. Grassini, "The Iron and Steel Industry and Underdeveloped Countries," in C. J. Friedrich and S. E. Harris (eds.), Public Policy, (Cambridge: Harvard Graduate School of Public Administration, 1958), p. 226.

[2]H. B. Chenery and T. Watanabe, "International Comparisons of the Structure of Production," paper presen[illegible] th[illegible] land Meeting of the Econometric Society, December, 1956, [illegible]. p. 106.

[3]PSFYP, p. 247.

commitment to heavy industry is well known as evidenced by the second plan.

In Pakistan there exists a paucity of the needed minerals for an iron and steel industry. Almost all of Pakistan's metallic and nonmetallic minerals are found in West Pakistan. About forty per cent of the iron ore is located, unfortunately, in the presently inaccessible region of Chitral on the Afghanistan border with most of the remainder occurring in the Kalabagh area and being readily available. The relatively poor quality of Pakistan's coal has been discussed earlier. Manganese of good quality and which is easily accessible is found in Pakistan, but the known extent of deposits only amount to about 500,000 tons. Limestone, the fourth important ingredient to an iron and steel industry, is in abundant supply and its wide production (Table 25) supports one of Pakistan's major mineral based industries, cement.

A capacity of 350,000 tons will be established soon and the production will be based on imported pig iron and scrap. This decision is similar to the one taken in the case of oil refineries where the savings of foreign exchange had been a major factor. The new capacity will meet about three-fourths of the demand for iron and steel in the country and a very active attempt will be made to determine the economic and technical reasibility of establishing an integrated iron and steel plant based on local materials or possibly imported ore. If a mixture of local ore with imported ore is needed, additional port facilities will also be needed.

Substantial quantities of natural gas, limestone, and gypsum allow cement to be produced economically, especially in West Pakistan. East Pakistan has a shortage of limestone. Pakistan should catch up

with the rapidly increasing demand for cement by 1965 and have a surplus for export by this time period.

Along with gypsum, Pakistan also fared better than India after partition in the natural resource of chromite. Most of the chromite production is in the Quetta region and is exported to the West through Karachi. Silica sand, salt and bauxite (Table 52) make up the remainder of Pakistan's slim storehouse of major minerals and support the glass, chemical and refractories manufacturing activities in the country.

TABLE 52

PAKISTAN'S MAJOR MINERAL RESERVES AND PRODUCTION FOR SELECTED YEARS[a]
(000 long tons)[b]

Item	1951	1952	1953	1955	1959	1960	Reserves
Chromite	17.5	17.2	23.4	28	16	--	abundant
Gypsum	22.8	28.8	27.2	28	85	--	250,000
Limestone	344	672.4	878.7	866	925	--	abundant
Silica sand	3.7	4.6	7.7	9	22	--	N. A.
Fireclay	4.0	6.3	5.1	8	14	--	N. A.
Rock Salt	--	--	--	140	157	--	N. A.
Salt, total	--	300	320	405	288	431	abundant
Bauxite	--	--	--	1	2	1	300
Iron ore	--	--	--	--	1	2	170,000

Source: United Nations Statistical Yearbook; R. Platt, Pakistan; Pakistan Bureau of Mines; Investment in Pakistan.

[a]Excluding petroleum and coal.

[b]All figures are in 000 long tons except salt, bauxite and iron ore production figures which are given in metric tons.

Pakistan has, as does India, considerable small-scale and cottage industry. These activities occupy the time of five to seven million persons[1]

[1]Andrus, p. 190.

heavy industry but a broad range of industry as well as a source of export earnings. Within India's borders are found one-quarter of the world's known reserves of iron ore and most of the world's mica deposits both of which are important exports. India ranks third in the world in manganese ore, another important export, and her ilmenite and kyanite occurrences are the largest in the world. Bauxite, magnesite and limestone reserves are also large and should be capable of meeting demands for many years to come.

Some 243 iron ore mines are operating in the country with the bulk of the production coming from the Orissa-Bihar border concentration. Production has greatly increased (Table 17) in the last decade as domestic consumption has gone up and the use of iron ore as a foreign exchange earner has been expanded. Based on iron and steel targets, India's internal consumption requirements by the end of the third plan should go up to 20 million tons with another 10 million tons going into export chiefly to Japan. India's iron ore exports by 1971 could reach 25 million tons annually.[1]

Only about one-fourth of the manganese ore mined is consumed internally, with the rest being exported. As the "cream of the known reserves is already gone, and India will shortly have little left but eroded hillsides and waste,"[2] steps are being taken to beneficiate the vast quantities of manganese waste in an effort to prevent seriously depleting the reserves of high grade ore that still rem:'-

Bauxite, gypsum and limestone production over the past ten years

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[1] Steel (December 17, 1962), p. 158.

[2] R. Platt, India, p. 378.

has increased significantly and reflects the expansion of the nation's aluminum industry as well as the fertilizer, cement, steel and other industries.

Deficiencies, however, exist in the non-ferrous metals. Domestic production of copper and lead provide only twenty per cent and ten per cent respectively of the present needs and while no zinc metal is produced the zinc concentrates production sent to Japan for processing still accounts for only five per cent of present consumption.[1]

While copper has been known to have been produced in India some 2,000 years ago there is only one copper enterprise presently operating in India, the Indian Copper Corporation, Ltd. This concern has mines at Mosaboni and a smelter and refinery at Maudhaudhar and Ghatshil, Bihar. Annual production runs about 8,000 tons and the metal is suitable primarily for brass and bronze manufactures. It is in the electrolytic type of copper that the main internal requirements must be met. Plans call for a new electrolytic refinery plant at Ghatshila, Bihar, with a 8,500 ton capacity and the government is contemplating a like plant at Khetri, Maharastra, with a 10,000 ton capacity. These new facilities should help save some foreign exchange but as India's consumption of copper and copper alloys was 75,652 tons in 1961[2] and expected to increase, the bulk of the requirements will continue to be met from abroad.

The picture in lead and zinc production is much the same as in copper with the Metal Corporation of India, Ltd., being the sole

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[1]United Nations Economic Commission for Asia and the Far East, Copper, Lead, Zinc Ore Resources of Asia and the Far East (Bangkok: United Nations, 1960), p. 22; hereafter cited as ECAFE, Copper, Lead and Zi

[2]Ibid., p. 77.

miner of lead-zinc ores at Zawar, Rajasthan. The lead concentrates are shipped to Tundu, Bihar, for smelting. A zinc smelter of 10,000 ton capacity is being considered by the same company at Udaipur and is expected to conserve Rs. 21 million in foreign exchange.[1]

Despite shortages of certain minerals, widespread diversification of industry based on indigenous natural resources has already begun in India as depicted in Table 16. In Pakistan where the stock of mineral wealth is more limited the immediate considerations revolve around how to best utilize the existing materials and how to relieve the serious shortages that exist. It can be said that the same applies to India to some extent. However, in India where the mineral wealth is so much greater not only in terms of extent but also variety, there is more flexibility available in trying to solve the problems. Wherever the choice of actions is greater there is likely to be differences of opinion on how to proceed toward chosen goals.

India's second plan and subsequent planning reflects the preference to develop heavy industry as rapidly as possible in an effort to remove the country's dependence on such imports in the future. This approach recognizes that large foreign exchange expenditures would be needed in the short run and that consumer goods would receive less emphasis during the build-up period.

The dissenters to this approach, who are in the minority among the planning authorities in India, feel that such highly capital intensive projects do little to alleviate the unemployment problem. They point out that the twin goals of large expansion of employment opportunities

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[1]*Ibid.*, p. 22.

and emphasis on heavy basic industries are incompatible. One or the other of these goals would have to receive more emphasis and in this case it has been industry over employment. The employment goal was pursued through "the taxation of factory consumer goods to subsidize cottage industry to provide employment."[1]

There are obvious advantages and disadvantages to any short versus long term approaches. This writer believes that India has taken a calculated risk in an attempt to rapidly bridge the gap between her present condition and that of sustained economic growth. This path has required large scale assistance from abroad, the consent of the people or at least no widespread dissent and a determined willingness to plunge into relatively uncharted areas of activity. While India has been relatively successful in these respects, this position is not without some vulnerable aspects.

Insistence that most of this investment be in the public sector is slowly souring some of the donors of foreign assistance and may require an adjustment of policy in the future. India has also not been willing to make any widespread use of foreign skilled technicians and management as evidenced by her wage policies concerning such personnel. Because of the shortcomings that emerged in iron and steel and coal industries in the public sector, government management has been placed in the position of having to demonstrate that it is capable of effectively managing the various industries that are being established in the public sector.

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[1]A. O. Krueger, "Indian Planning Experience," in T. Morgan, G. W. Betz and N. K. Chaudgry (eds.), Readings in Economic Development (Belmont: Wadsworth Publishing Company, 1963), p. 415.

The unfortunate situation in agriculture will have to be solved quickly if only to keep the confidence of the general populace. Some shift away from long term considerations to the short term seems likely. The degree of the shift will be influenced by the manner in which India is able to cope with the pockets of discontent that are building up. Regardless of what changes may occur, India should not be limited to any degree by the availability of domestic mineral resources.

Summary and Conclusions

The role of minerals and agriculture products in the drive for economic development is one of considerable influence. They influence the composition of industry as well as the direction of a country's economic development.

India and Pakistan are practicing an import substitution policy in an endeavor to conserve foreign exchange. The use of such a policy helps to illustrate more clearly the importance of natural resources to development. When a country tries to substitute home production for certain imports, its ability to be successful requires recognition of the role that natural resources will play. While such recognition does not mean that natural resources have caused a certain industry to be developed, it does point up the influence that natural resources have in determining what will be produced at home. To make such a policy workable, national resources must be available to aid in the substitution. India, for instance, can now produce certain types of railway equipment which were formerly imported. Pakistan has successfully substituted local natural gas for imported fuels. It follows that the

greater the variety, quantity and quality of home resources the greater the flexibility a country has in applying such a policy. This proposition can be expanded to include not only implementation of an import substitution policy but also a country's chances of achieving sustained growth.

While some countries have been able to progress economically without a well endowed resource base, these instances have not been frequent. Such achievements may appear to offer hope to some nations that also have a meager endowment of natural resources but chances of duplicating the same set of circumstances may prove to be unduly slim. It remains pertinent to question whether an underdeveloped country, which is typically faced today with an uneducated population, a low degree of technological ability and a shortage of capital, can realistically expect to be able to overcome its deficiencies to any appreciable degree if its economy is dependent on a meager endowment of natural resources.

The mineral and agricultural raw material bases of India and Pakistan differ widely in content and size. Agricultural products and related manufactured items are the main export earners for both countries. However, expansion of these agricultural exports appears limited unless various measures are taken.

Jute and cotton provide the basis for two of Pakistan's major industries and account for over fifty per cent of the total export earnings. Dependence on these items for future export earnings, especially textiles, will require close attention as these products face competition in world markets.

Because Pakistan has a dearth of mineral resources it is

especially important for it to protect its established markets in textiles, raw jute and jute manufacturers. Jute is also being faced with increased competition from substitutes such as paper and kenafe and is affected by changing methods of handling bulk goods. If export earnings are to be maintained, very close consideration must be given to keeping jute competitive. Research is also needed to expand its applications. To lose the market for jute to substitutes would indeed be a great blow, not only to Pakistan, but to India as well.

Tea is also a notable source of foreign exchange earnings for the two countries and heads the list of India's export earners. Promotions designed to stimulate increased tea drinking abroad could possibly help, but the poor flavor qualities of the tea will hamper its expansion abroad.

In order for a mineral resource to play a role, a country has to be aware of its presence, acknowledge its utility, and decide whether to use it. The country must further be able to provide the technology needed to integrate the mineral resource into the manufacturing process. Neither India nor Pakistan has as yet acquired a detailed knowledge of its natural resource pattern, but present information indicates that neither country is self-sufficient in minerals.

A comparison of the two countries' mineral bases reveals India's position to be considerably more favorable than that of Pakistan. India not only has a greater number of minerals but also considerable resources in a variety of minerals. This distinct advantage in minerals is further reflected in the broader range of industr to

date as well as the increasing appearan ed

CHAPTER VII

CONCLUSIONS

Since an economic plan is designed to serve as a guide to action over a certain period of time, measurement of its success or failure is a matter of degree. Even partial fulfillment of a target may be viewed as a successful contribution since there is so much that has to be done at this stage of development of the subcontinent. India's first plan has been generally accepted as successful and her second plan as less successful. The results of Pakistan's first plan have been less successful because of the circumstances surrounding its inauguration and the attitudes of government officials concerning its emphasis.

India was able to increase per capital income by 10.5 per cent in the first plan period and by eight per cent in the second plan. Pakistan was able to increase per capita income by only three per cent during the first plan period. Per capita income for 1960 in both nations stood at Rs. 330 or about $69.00. The two countries have benefited from their planning experience and should be more aware of the obstacles which lie ahead. They now have industries which did not exist prior to independence and have laid some of the initial foundation needed in the drive for economic development.

In examining the experiences of the two nations for lessons that may be of value in the future, the areas involving political

stability and relations between neighboring countries rise to the fore. A relatively stable political environment in India since independence has aided the country in organizing itself and in launching its economic development programs. Pakistan, on the other hand, was hampered by political instability and was unable to get its planning started as early or with the same ease as India. When internal calm finally came in 1958 with the coming into power of the Khan regime, the effects on the first economic plan were very obvious. The economic plan, for the first time, received the full support of the government. Land reforms were put into effect in West Pakistan, and many of the programs which were lagging received new impetus. The frictions between the two provinces have been lessened somewhat, but this problem has not been resolved. Communications between the two sections should be strengthened, and the needs of both must be equitably considered by the central government if the undesirable results of intense provincialism are to be avoided in the future.

Friction between India and Pakistan has been costly not only in terms of human life and defense expenditures but also has led to policies designed to eliminate any dependence each may have had on the other. Areas which were complementary to each other before independence are now striving for complete self-sufficiency. For example, the loss of Calcutta to India has required Pakistan to incur large expenditures to expand the Chittagong port and keep the jute trade channels open. India, on the other hand, has had to assign land to jute growing to keep its mills operating. It is unlikely that this situation will improve to a point where normal trade channels can function again if the

Kashmir dispute remains unresolved.

The importance of natural resources to the economic development of a nation is very difficult to measure, especially in quantitative terms. Hence, this study has endeavored to clarify the role of natural resources both in general terms and as this role affects various sectors by examining the resource qualities, relationships and influences which pertain to the activities of the sectors.

Recent general writings on economic growth and development have tended to assign a subordinate role to the natural resources factor in the economic development of a country.[1] In the case of developed countries, the decline of the relative price of agricultural land as well as the decline in the amount of rising income spent on natural resources is mentioned. This has limited applicability to the subcontinent at present, and whether the role of resources will decline in India and Pakistan in the future remains to be seen. Since the evidence is incomplete and depends on a particular set of conditions that surrounded a particular country during a particular time in its history, it is open to question whether the experience will be similar in the case of the presently underdeveloped countries.

Other reasons which may contribute to the belief that natural resources are not particularly important include the existence of countries which are well endowed with natural resources but remain underdeveloped and other countries which have reached relative economic maturity with a meager endowment. It is noteworthy that the number of instances where countries with small resource bases have become

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[1]Cf. pages 11 and 12 of Chapter I of this dissertation.

relatively developed are few. While such experiences have shown that abundant natural resources at times are not a pre-requisite for development, such experiences need not detract from the role that natural resources did play in the early development of these countries.

It must be recognized that, in the case of countries which remain underdeveloped but have an abundant supply of natural resources, a variety of factors are involved in economic development. It is reasonable to assume that an abundant resource base will make the development tasks of these countries easier once the various other conditions for development become present.

It has also been pointed out that domestic unavailability of natural resources need not be an obstacle to development because of the substitution qualities of natural resources, their relationship to technology and other factors, and the role of international trade in overcoming deficiencies. While such contentions are generally valid, they also have limitations which may not be readily apparent. To be of value they need broad qualification when applied to a given area as shown by the experience of the subcontinent. While substitution is designed to eliminate problems, there are problems associated with its implementation.

There are times when substitution of one resource for another will be helpful, but the effectiveness of the substitution may be limited because of the characteristics of the resources involved. Pakistan, for example, is substituting natural gas for coal and other fuels which are in short supply, but the substitution only is partial because coal can be used in so many more applications.

Substitution of technology and other factors for natural resources is rarely perfect and usually partial. Natural resources and technology have a mutual relationship and to recognize this kinship is to acknowledge that each has a role to play. New technology is presentl helping to enhance the existing resources of land and water on the subcontinent by rearranging these resources to make them more efficient and by providing the farmers with new ways of conducting their agricultural activities.

Raw materials can be imported from other countries in order to overcome shortages. The use of this method is limited only by the means to acquire them. Countries such as Pakistan and India, which have national economic plans in force, are generally faced with a shortage of foreign exchange and have stressed import substitution wherever possible. This condition has led to a focusing of attention on their resource bases and the role which they will play in development. The resource bases will certainly determine to a large extent the composition of their exports.

A country must first know what natural resources occur within its borders if the resources are to play a role in its economy. Neither India nor Pakistan has a good knowledge of the extent of its resource bases. Once this information is available, they must decide which of these resources to utilize and must demonstrate the ability to acquire or devise the technologies necessary to use them. Technologies which have been developed and used successfully in other countries may not necessarily fit the conditions of India and Pakistan; thus, care must be taken in the selection of such technologies if they are to be available.

While there are considerable opportunities for improvement in any heavily populated nation, the experience of the subcontinent illustrates the importance of being successful in agriculture which is usually the dominant sector. Success in this sector can lead to, among other things, higher incomes for the rural population, steady or increased export earnings, a dependable food supply, a greater acceptance of the broad development programs and optimism concerning their successful completion. On the other hand, failure can result in increased imports, revision of economic plans, food riots and political instability. Unfortunately, all of the latter conditions have occurred recently on the subcontinent.

Both nations face approximately the same pressures in agriculture although pressure on land resources is expected to be a bit greater in Pakistan in the future. India has made steady progress during her plan periods in increasing key foodgrain production while Pakistan's production has remained relatively unchanged. Pakistan is behind India in many planning phases, has not had as much experience with national plans and has a considerably lower irrigation potential.

It is evident that rapidly growing populations, a seriously declining availability of agricultural land, use of outmoded methods, an unpredictable climate and a shortage of foreign exchange are contributing factors to the present grave condition of agriculture in both countries. Sizeable expenditures of capital and human effort during the previous plan periods have not solved the food shortage problem. Renewed emphasis and high priorities must be given to programs which simultaneously attack both the population and land productivity aspects

of the problem. Success is more crucial in this area than in others because deteriorating conditions in this sector can jeopardize the rest of the economic plans. Hungry people lose patience and confidence in their government very quickly.

Additional emphasis on family planning would be desirable. However, this can be viewed as only a partial solution to the problem; furthermore, its effects would not be felt for a number of years. W[illegible]re effort [illegible] needed in all the many agricultural programs already begun, particular attention should be given the following areas: irrigation, because the sizeable unrealized potential in both countries would permit increased double cropping as well as better control of the monsoon rains and their damaging qualities; fertilizer and soil conditions, because this desirable method of raising crop yields scarcely has been exploited to date; fisheries, because of their potential contribution to solution of the food and diet problem and because only a small fraction of this resource has been utilized by either country; community development organizations of India and village aid agencies of Pakistan, because of their crucial importance to the transformation of both agrarian structures.

The agricultural experience of India and Pakistan provides an excellent example of the complexities and difficulties involved in implementing programs that are largely designed to effect the partial substitution of technology for land. Such a measure calls for far reaching changes in many areas of activity ranging from increased educational facilities and upgrading of the farmer's knowledge, implements and animals to better land and water management and persuasion of the farmers

to use the new and better methods. Problems encountered in the implementation of the numerous programs ranged from inadequate planning and co-ordination between government agencies and late delivery of equipment from abroad to farmers who preferred to trust to rainfall rather than pay for irrigated water and the refusal of some farmers to use fertilizer. Thus, while technology together with land, water and other resources will undoubtedly continue to play important roles in increasing agricultural productivity in the future, implementation will remain a problem for a long period of time.

The indigenous mineral resources in a nation influence the direction of power development and economic development in general for it is usually on these resource bases that the power systems repose. This is evident in Pakistan and India where the resource pattern and power potential differ.

At times large deposits of a natural resource may attract foreign investment or stimulate new research into ways of utilizing a large deposit of a resource. Examples of such occurrences are found in the power and fuel sectors of the two countries. The discovery of a large reserve of natural gas at Sui, West Pakistan, has attracted sizeable British investment. Possession of one of the largest known thorium deposits in the world has prompted Indian research into its use as a future source of atomic power.

India enjoys a wide superiority over Pakistan in power resources. The advantage is not only in the larger amounts of these resources but also in their qualities and application capacities. India's hydroelectric potential is four times the size of Pakistan's potential and her reserves

of coal are vastly larger. Large thorium deposits provide India with a future base for atomic power, an advantage not enjoyed by Pakistan. Pakistan's sole advantage is in natural gas reserves.

Both nations need to expand oil exploration to gain a better idea of whether they will be forced to continue imports of this commodity indefinitely. Pakistan needs to have a better understanding of its hydro potential since natural gas is the only other known important resource available for power and fuel in the country. Both of these resources can be expected to be used as substitutes for coal and oil wherever feasible. Finally, both nations must face their fuelwood problem if agriculture is to benefit from the fertilizer potential of the readily available cattle dung.

In much the same way that the power resource bases have influenced the direction of power and fuel development, so also do the mineral and agricultural raw material bases influence the composition of industry and exports. This is again evident in both countries, where the mineral bases vary widely but the agricultural raw materials composition is somewhat similar.

A comparison of the mineral resource bases of the two countries gives credence to the proposition that the greater the kinds, quantities, and quality of indigenous natural resources available to a country, the greater the opportunity for operation and range of choice the country has in pursuing its plans for economic development. Here, as in the case of power resources, India has a wide advantage over Pakistan. Indeed, Pakistan has superiority only in chromite and gypsum, the former of which is not utilized at home but exported in raw form. Thus, it is

not surprising that Pakistan's two major industries are based on agricultural products.

While both nations are faced with the need to conserve foreign exchange and desire to substitute domestic production for as many imports as possible, India with its extent and diversity of minerals is in a better position to implement such a policy. India's more favorable position has permitted the country to begin development of a broad range of industry and its chances of achieving a long range diversified industrial foundation are much better than those of Pakistan.

Even though the major export earnings of both countries presently come from agriculture products, India has been able also to export minerals and will begin to add various manufactures to its exports as development progresses. Unless Pakistan can overcome formidable mineral accessibility problems and devise technologies to better utilize its limited resource base, its future industrial pattern will probably be based primarily along the lines of agriculture and natural gas.

The experience of the subcontinent has been a story of the disparity between the bases of the two nations and their attempts to raise their level of living through planned economic development. India, with the larger overall tasks though possessing a better resource foundation as well as more trained personnel, has had more planning experience and relative success over a broad range of programs than has Pakistan. Pakistan, having serious shortages of trained people as well as resources in some areas, has had a later start in planning, has suffered from political instability and not being a geographical entity, and has been relatively less successful to date.

Both nations, despite the progress they have made since independence, remain largely underdeveloped as measured by per capita income, energy consumption, iron and steel production or almost any measure one may choose to apply. Both will continue to require large foreign aid assistance for some years to come in their long range drive for development. From the point of view of natural resources, India has the capability of becoming a modern industrial nation. Pakistan, with a more limited supply of natural resources, will have to exploit her advantages in agriculturally based products even further and use great ingenuity in the utilization of existing minerals if the country is to become developed.

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The role of natural resources in economic development has received very little attention from writers in this field. The intent of this study is to examine and to compare the economic development of India and Pakistan from the period since independence up to recent times (1947-1960) and to focus wherever possible on the part which natural resources have played in this development.

The dissertation first examines the literature concerning economic growth and development and the obstacles which exist to formulating a satisfactory theory in this field. The physical setting of the Indo-Pakistan subcontinent is presented and such factors as location and extent of area, major topographical features, climate and soils are emphasized.

The economic planning experiences of both countries are evaluated in terms of their economic policies, targets, investments and achievements. Chapters on agriculture, power and fuels, minerals, agricultural products and industry describe the major problems of these sectors and the role which was played by natural resources.

Sources used for the dissertation were largely the government publications of India and Pakistan. Economic periodicals and banks dealing with the economic development of the two countries were used to supplement the official publications.

The principal conclusions of the study are as follows:

1) Natural resources are important in the earlier stages of development because they are a source of exports and because they permit